CURTIS'S

BOTANICAL MAGAZINE,

ILLUSTRATING AND DESCRIBING

Plants of the Royal Botanic Gardens of Kew,

AND OF OTHER BOTANICAL ESTABLISHMENTS;

EDITED BY

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VOL. XIII.
OF THE FOURTH SERIES.
(Or Vol. CXLIII. of the Whole Work.)

For all that nature by her mother-wit
Could frame in earth, and forme of substance base
Was there; and all that nature did omit,
Art, playing second nature's part, supplyed it.—SPENSER.

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To

RICHARD IRWIN LYNCH,
M.A., A.L.S., V.M.H.,

CURATOR, BOTANIC GARDEN, CAMBRIDGE,

TO WHOSE ENTHUSIASM AND SKILL

AS A CULTIVATOR,

AND TO WHOSE GENEROSITY

AS A CONTRIBUTOR,

THE BOTANICAL MAGAZINE

IS INDEBTED FOR MANY SUBJECTS,

THIS VOLUME

IS CORDIALLY DEDICATED.

Kew, December, 1917.

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M.S. del. J.N. Fitch. lith.

Vincent Brooks, Day & Son Lt.d imp.

Tab. 8692.

AMORPHOPHALLUS Kerrii.

Siam.

Aroideae. Tribe Pythonieae.

Amorphophallus, *Bl.*; *Benth. et Hook. f. Gen. Plant.* vol. iii. p. 970.

Amorphophallus Kerrii, *N. E. Brown in Kew Bulletin*, 1912, p. 43; affinis *A. corrugato*, N. E. Br. sed petiolo albido-viridi-maculato, ovariis viridibus stylis brevioribus et appendice levi differt.

Herba tuberosa perennis. *Folium* solitarium, erectum, glabrum; petiolus 1 m. longus, viridis albido-viridi-maculatus; lamina trisecta, ramis semel furcatis pinnatisectis; segmenta inferiora 5–10 cm. longa, 3–5·5 cm. lata, elliptica vel lanceolata; segmenta ultima 15–25 cm. longa, 5·5–7·5 cm. lata, lanceolata, acuta vel acuminata, basi in alam 0·4–2 cm. latam decurrentia. *Pedunculus* 25 cm. (vel ultra?) longus, 1 cm. crassus, atro-viridis vel olivaceo-brunneus, ocellis albido-viridibus maculatus. *Spatha* erecta, 15–18 cm. longa, 5–6 cm. lata, lanceolata, concava apice leviter procurva, acuta, basi breviter convoluta marginibus haud undulatis, viridis, extra ocellis albido-viridibus maculata. *Spadix* spatha multo brevior, stipitata; pars feminea 1·5–2·5 cm. longa, 1·5 cm. crassa, cylindracea, viridis; pars mascula 1·5–2·5 cm. longa, 1·2–2·5 cm. crassa, cylindracea vel ellipsoidea, alba; appendix 3·8–5 cm. longa, 1·6–2·5 cm. crassa, subcylindrica vel obtuse trigono-ovoidea, levis, lacteo-alba vel pallide luteo-viridis. *Baccae* 1·5 cm. longae, 1 cm. crassae, ellipsoideae, coeruleae.—N. E. Brown.

The handsome *Amorphophallus* here figured is one of several species of the genus obtained by Dr. A. F. G. Kerr in the Chiengmai district, Siam, tubers of which were forwarded by him to Professor H. H. Dixon for cultivation in the Botanic Garden of Trinity College, Dublin. The present species, one of the most striking, flowered there in March in the years 1910, 1911 and 1912 and ripened fruits in July, 1915; as is not unusual in the genus, the leaves appear after the flowers. For the fresh material at its various stages utilised in preparing our plate we are indebted to Professor Dixon. Mr. S. G. Wild, whose enthusiasm is so well known, and to whom the care of the tubers was intrusted, informs us that *A. Kerrii* is best grown in a compost consisting of two parts good loam with one part each of leafsoil, peat and sand. It requires ample pot-room, a genial atmosphere and a temperature

ranging from 65° to 70° F. during the growing season. Corms potted at the beginning of March flower in April and May, when adequate water should be supplied till about the end of September, an occasional application of liquid cow manure being beneficial. After September the pots may be stored in heated frames with a minimum temperature of about 45° F., and should be kept quite dry. The corms are readily increased by offsets, and if one is fortunate enough to fertilize the flowers, seeds may be obtained which, if sown as soon as ripe, produce new corms which should flower about their third season.

DESCRIPTION.—*Herb*, perennial, tuberous. *Leaf* solitary, erect, glabrous; petiole over 3 ft. long, green, blotched with greenish-white; lamina 3-sect, the branches once forked, and pinnatisect; lower segments 2–4 in. long, 1¼–2¼ in. wide, elliptic or lanceolate; terminal segments 6–10 in. long, 2¼–3 in. wide, lanceolate, acute or acuminate, decurrent below in a wing ⅙–¾ in. wide. *Peduncle* 10 in. long or perhaps in wild plants taller, over ⅓ in. thick, dark green or olive-brown with greenish-white blotches. *Spathe* erect, 6–9 in. long, 2–2¼ in. wide, lanceolate, concave, slightly curved forward at the tip, acute, slightly convolute at the base, margins even, green, outside with greenish-white blotches. *Spadix* stipitate, much shorter than the spathe; female portion ⅔–1 in. long, ⅔ in. thick, cylindric, green; male portion ⅔–1 in. long, ½–¾ in. thick or rather thicker, cylindric or ellipsoid, white; appendix 1½–1¾ in. long, ⅔–1 in. thick, subcylindric or bluntly trigonous-ovoid, smooth, milky-white or pale yellowish-green. *Berries* ⅔ in. long, over ⅓ in. thick, ellipsoid, blue.

TAB. 8692.—Fig. 1, flowering spadix; 2, male flowers; 3, female flowers; 4, ovary in vertical section, with ovules; 5, sketch of an entire plant:— *all enlarged except* 1, *which is of natural size, and* 5, *which is much reduced.*

M.S del. J.N. Fitch lith.

Vincent Brooks, Day & Son Ltd. imp.

L. Reeve & Co. London.

Tab. 8693.

CYTISUS albus.

Spain and Portugal.

Leguminosae. Tribe Genisteae.

Cytisus, *Linn*; *Benth. et Hook. f. Gen. Plant.* vol. i. p. 484.

Cytisus albus, *Link, Enum. Hort. Berol.* vol. ii. p. 241; *DC. Prodr.* vol. ii. p. 153; *Loud. Arboret.* pars iii. p. 589, fig. 282; *Spach in Ann. Sc. Nat.* 3me sér. vol. iii. p. 152; *G. Don, Gen. Syst.* vol. iii. p. 154; *Willk. et Lange, Prodr. Fl. Hisp.* vol. iii. p. 457; *C. Schneider, Handb. Laubholzk.* vol. ii. p. 43; *Bean, Trees & Shrubs*, vol. i. p. 457: *nec* C. albus, *Haquet, stirps balcanica melius monente Briquet pro subspecie* C. supini, *Linn., habenda*; species *C. purganti*, Benth., et *C. acutangulo*, Jaub. et Spach, affinis, ab illo floribus albis nec luteis, ab hoc foliolis pro ratione angustis, ab utroque habitu graciliore, ramis elongatis foliis inferioribus 3-foliolatis nec omnibus 1-foliolatis differt.

Frutex erectus ad 2 m. altus, admodum ramosus ramis multicostatis primo argenteo-sericeis mox glabrescentibus. *Folia* inferiora 3-foliolata, petiolo 6–8 mm. longo suffulta, superiora 1-foliolata, petiolata vel subsessilia; foliola lineari-lanceolata vel anguste oblonga, in planta culta ad 12 mm. longa, 4 mm. lata, in spontanea minora et pro ratione angustiora, argenteo-sericea; stipulae 0. *Flores* copiosissime secundum ramos virgatos dispositi, solitarii vel 2–3-ni ex axillis foliorum; pedicelli graciles, 4–5 mm. longi. *Calyx* persistens, breviter campanulatus, parce pilosiusculus, labiis aequilongis brevibus denticulatis. *Corolla* alba vel in prole quadam culta roseo-tincta, petalis aequilongis ad 1 cm. longis. *Legumen* suboblique lineari-oblongum, 2·5–3·5 cm. longum, 6–8 mm. latum, adpresse sericeo-hirsutum.—*C. multiflorus*, Sweet, Hort. Brit. ed. 1, p. 112; Briquet, Étud. Cytis. p. 154; Aschers. & Graebn. Syn. Mitteleurop. Fl. vol. vi. Abteil. ii. p. 300. *C. lusitanicus*, Quer apud Willk. Prodr. Fl. Hisp. Suppl. p. 256; Lazaro, Compend. Fl. Esp. vol. ii. p. 227; Coutinho, Fl. Portug. p. 427. *Genista alba*, Lamk, Encyc. Meth. vol. ii. p. 622. *G. multiflora*, Nouv. Duham. vol. ii. p. 76, t. 23. *Spartium multiflorum*, Ait. Hort. Kew. ed. 1, vol. iii. p. 21; Willd. Sp. Pl. vol. iii. p. 930 et Enum. Hort. Berol. vol. ii. p. 744; Ait. fil. Hort. Kew. ed. 2, vol. iv. p. 256. *S. multiflorum incarnatum*, Lodd. Bot. Cab. t. 1052. *S. dispermum*, Moench, Meth. p. 130; Willk. in Ust. Mag. vol. iv. pars xi. p. 35, t. 2. *S. album*, Desf. Fl. Atlant. vol. ii. p. 132. *Spartothamnus albus*, Presl, Bot. Bemerk. p. 138. *Sarothamnus parviflorus*, Willk. et Cut. ex Willk. in Linnaea, vol. xxx. p. 95. *Spartocytisus albus*, C. Koch, Dendrol. vol. i. p. 31.—O. Stapf.

The Portugal White Broom, here figured, a native of northern and central Spain and Portugal, has had a somewhat chequered cultural history. Whether it be, as Lamarck and others have thought, the *Genista alba*

figured by Tabernaemontanus in 1588, seems open to doubt; L'Escluse, whose Spanish notes were published in 1576, does not allude to the species, and Tabernaemontanus has not recorded the native habit of his plant. Tournefort, who met with this broom in Portugal in 1688, named it *Cytisus lusitanicus foliis minimis argenteis parvo flore albo*, and sent a specimen to Bobart, who identified both it and some specimens of *Retama monosperma*, Boiss., with the *Genista alba* of Tabernaemontanus. The specimen given by Tournefort to Bobart is still in the Morison herbarium at Oxford, but that the plant had not been introduced to English gardens in 1699 when Bobart wrote, seems clear from the fact that there is no reference to it in the works of Ray. The earliest record of its cultivation in this country occurs in the third, or 1739, edition of Miller's Dictionary, where, as well as in the three subsequent issues of that work, it is given as the Portugal Base-Tree-Trefoil; in the second edition of the Hortus Kewensis, the younger Aiton, in 1812, refers to the circumstance that it was grown by Miller as recently as in 1752. Shortly thereafter the plant would seem to have been lost to English gardens; it is not included in the seventh edition of 1759, or in any later issue of Miller's work; moreover, the elder Aiton, in the first edition of the Hortus Kewensis, in 1789, treated it as a new *Spartium, S. multiflorum*, which he termed the Portugal White Broom, introduced to this country by Mr. James Gordon about 1770. Since this second introduction the plant has persisted in our collections; indeed, in 1812, a third introduction took place, this time of a form which is, however, but an unstable colour-variant, in which the flowers are flushed with pink. According to Loddiges, this form with incarnate blossoms was raised from seeds by Thomson at Mill-end; Loddiges, however, adds that "it may be increased by seeds which are perfected in abundance, but the produce are not all pink-flowered." Indeed, as our illustration shows, sprays with white flowers and others with the petals tinged with pink may at times be present on the same plant. That the Portugal White Broom is, as Tournefort had decided, a *Cytisus*, is not open to doubt, and Willkomm has stated that Quer, who accepted this view, actually named it

C. lusitanicus in conformity with Linnean principles. In the supplement to his Spanish flora Willkomm has accordingly adopted this obviously apposite name, and in this he has been followed by recent Spanish and Portuguese authors. Willkomm, however, has not cited the passage in which the name *C. lusitanicus*, Quer, occurs; the name is not employed in the Flora Española published by Quer in 1762 and completed by Ortega in 1784. In 1789 Lamarck, adopting the view of Bobart, treated this broom as a *Genista*, so that the name *G. alba*, Lamk, is the earliest verifiable one applied in conformity with modern usage. Unfortunately, long before Link, in 1822, retransferred the species to *Cytisus*, another *C. albus*, from south-eastern Europe, had in 1790 been duly described by Haquet. Meanwhile the elder Aiton, in 1789, had placed the Portugal White Broom in *Spartium*, as *S. multiflorum*; so that when Sweet, in 1826, corrected this error the species was transferred to *Cytisus* as *C. multiflorus*. In order to avoid the confusion created by the fact that the name *C. albus* had been used for two different brooms from south-eastern and south-western Europe respectively, recent writers, following Briquet, who has monographed the genus *Cytisus* with singular care, have felt constrained to employ for the Portugal White Broom the name *C. multiflorus*, Sweet, rather than the name *C. albus*, Link. In his monograph of the genus, however, Briquet has indicated that the plant described by Haquet, for which in 1803 Waldstein and Kitaibel proposed the name *C. leucanthus*, under which it was figured at t. 1438 of this work, is better treated as referable to *C. supinus*, Linn. So long, therefore, as the validity of the name *C. lusitanicus*, Quer, employed by Willkomm in 1893, remains doubtful, it is possible to follow Schneider in retaining for the Portugal White Broom the name *C. albus* under which, since the time of G. Don and Loudon, it has been familiarly known in English gardens. Among the cultivated brooms *C. albus* is distinct and valuable in being the only really hardy species with white flowers. Others with flowers of a similar shade are more or less tender; *C. albus*, even in very hard weather, remains unscathed, or at most only suffers

an occasional cutting back of the young succulent growths. Planted in broad masses at Kew, where it has been in continuous cultivation since the time of the elder Aiton, it gives charming effects when in bloom in May. It does not need a rich soil, and as it ripens seed in abundance it is easily increased. The material for our plate was derived from a plant in the collection at Kew, with mixed white and pink-flushed flowers.

Description.—*Shrub*, of upright habit, 5–7 ft. high, moderately branched, the branches striate, at first silvery-silky, soon becoming glabrous. *Leaves* low down 3-foliolate, with petiole $\frac{1}{4}$–$\frac{1}{3}$ in. long, those higher up 1-foliolate, short-petioled or nearly sessile; leaflets linear-lanceolate or narrow oblong, in cultivated plants up to $\frac{1}{2}$ in. long, $\frac{1}{6}$ in. wide, in wild plants smaller and proportionately narrower, silvery-silky; stipules 0. *Flowers* profusely arranged along the virgate branches, solitary or in twos or threes to each leaf-axil; pedicels slender, $\frac{1}{6}$–$\frac{1}{5}$ in. long. *Calyx* persistent, shortly campanulate, sparingly hairy, the lips short, denticulate, of about the same length. *Corolla* white or in one cultivated race flushed with rose; petals of about the same length, up to $\frac{2}{5}$ in. long. *Pod* somewhat obliquely linear-oblong, 1–$1\frac{1}{3}$ in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. wide, adpressed silky.

Tab. 8693.—Fig. 1, part of a leaf; 2, a flower, the petals removed; 3, calyx, laid open, with pistil; 4, standard; 5, wing; 6, keel:—*all enlarged*.

W. Swainson del. J.N. Fitch lith.

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Tab. 8694.

COTONEASTER salicifolia, var. rugosa.

Central China.

Rosaceae. Tribe Pomeae.

Cotoneaster, *Medik*; *Benth. et Hook. f. Gen. Plant.* vol. i. p. 627.

Cotoneaster salicifolia, *Franch. in Nouv. Arch. Mus. Paris*, sér. 2, vol. viii. p. 225 (1886); var. **rugosa**, *Rehd. et Wils. in Sargent, Pl. Wilson.* vol. i. p. 172 (1912); *Bean, Trees & Shrubs*, vol. i. p. 414 (1914); a planta typica foliis latioribus colore hebetioribus subtus novellisque indumento densiore magis lanuginoso indutis.

Frutex decorus, 2–3-metralis, ramis patentibus, ramulis gracilibus primum indumento deciduo lanuginoso pallide brunneo dense obtectis, demum glabris cortice rubescente insignibus. *Folia* rigide coriacea, persistentia, ovata vel subobovata, acuta, basi cuneata, margine integra, 4–7·5 cm. longa, 1·2–4 cm. lata, supra rugosa, glabrescentia, saturate viridia, subtus primum dense lanuginosa, demum albo-cinerea costa nervisque lanuginosis exceptis glabrescentia; nervi utrinsecus 9–11, supra impressi; petiolus 2–6 mm. longus, lanuginosus. *Corymbi* 2·5–5 cm. lati, ramulos 2–4-foliatos terminantes. *Flores* sordide albi, aestivales, 6 mm. lati. *Calyx* lanuginosus, infundibularis, 5-lobus; lobi breve triangulares, erecti, acuti. *Petala* 5, suborbicularia. *Stamina* circiter 20; antherae rubescentes. *Fructus* globosus vel subovoideus, 6 mm. latus, laete corallinus; pyrenae 2, compresso-hemisphaericae, dorso sulcatae.—*C. rugosa*, E. Pritzel in Bot. Jahrb. vol. xxix. p. 385 (1900); Schneider in Ill. Handb. Laubh. vol. i. p. 758 (1906).—W. J. Bean.

This variety of *Cotoneaster salicifolia* was discovered by Mr. E. H. Wilson on the mountains of Western Hupeh at altitudes of 5,000 to 6,000 feet both to the north and south of Ichang. From seed collected by him in October, 1907, and received at Kew through the agency of the Arnold Arboretum the following spring, the plant now figured was raised. Since its introduction the winters have been mild and it has proved evergreen, but it is possible that, as with some other ordinarily evergreen Cotoneasters, its foliage may prove deciduous in our hard winters. It likes a sunny position and a loamy soil, and being very amenable to cultivation promises to develop into one of the finest members of the genus in gardens. It is easily increased by seed or by cuttings.

January, 1917.

From the typical *C. salicifolia*, which we are not certain is at present in cultivation, the variety now figured differs in the leaves being broader and duller green, and in their lower surface as well as the young branchlets being covered with a coarser, more woolly pubescence. Another variety, *C. salicifolia* var. *floccosa*, Rehd. et Wils., is cultivated at Kew, and is well distinguished by its narrower leaves and three-stoned fruits. The nearest ally of *C. salicifolia* is *C. Henryana*, Rehd. et Wils., also from Western Hupeh; this differs by its ovoid fruits and larger leaves pubescent on both surfaces.

DESCRIPTION.—*Shrub* up to 10 ft. high of graceful habit, branches spreading. *Branchlets* slender, at first clothed densely with a pale brown wool, most of which falls away by autumn exposing the handsome, dark reddish-brown bark. *Leaves* stiff and coriaceous, persistent, oval to slightly obovate, acute, cuneate at the base, entire, 1½–3 in. long by ½–1½ in. wide; dark dull green, rugose and glabrescent above; at first wholly lanuginose beneath, ultimately greyish-white, with wool on the midrib and veins only; veins in nine to eleven pairs, deeply impressed above; petiole ½–¼ in. long, lanuginose. *Corymbs* 1–2 in. wide, terminal on 2–4-leaved branchlets. *Flowers* dullish white, opening in June, ¼ in. wide. *Calyx* woolly, funnel-shaped, with five short, erect, acute, triangular lobes. *Petals* five, rotund. *Stamens* about twenty; anthers brownish-red. *Fruit* globose to slightly ovoid, ¼ in. wide, bright coral red; stones 2, compressed-hemispherical, grooved on the dorsal side.

TAB. 8694.—Fig. 1, flower bud; 2, flower; 3, calyx in vertical section, showing the pistil; 4 and 5, stamens:—*all enlarged.*

M.N. del. J.N. Fitch lith.

Ann. et Brooks, Day & Son Ltd. imp.

L. Reeve & Co. London.

Tab. 8695.

QUERCUS densiflora.

North America.

Cupuliferae. Tribe Quercineae.

Quercus, *Linn.*; *Benth. et Hook. f. Gen Plant.* vol. iii. p. 407.

Quercus densiflora, *Hook. & Arn. Bot. Beech. Voy.* p. 391; *Hook. Ic. Plant.* t. 380; *Nuttall, Sylva*, vol. i. p. 11, t. 5; *DC. Prodr.* vol. xvi. pars ii. p. 82; *Bolander in Proc. Calif. Acad.* vol. iii. p. 231; *Engelmann in Trans. St. Louis Acad.* vol. iii. p. 380; *Brewer & Watson, Bot. Calif.* vol. ii. p. 99; *Kellogg, Forest Trees Calif.* p. 69; *Sargent, Rep. Forests N. Amer.* p. 155; *Greene, Ill. West Amer. Oaks*, p. 41, t. 23; *Mayr, Wald. Nordamer.* p. 263, tt. 2 & 5; *Garden & Forest*, vol. v. p. 517, fig. 89; *Sargent, Silva N. Amer.* vol. viii. p. 183, t. 438; *Elwes & Henry, Trees of Great Brit. & Ireland*, vol. v. p. 1331; species americana sectionis *Pasaniae* unica, amentis erectis vel adscendentibus densifloris interdum androgynis, antheris minimis, cupula breviter poculiforme squamis longis linearibus patentibus vel recurvis tecta.

Arbor saepe 15–25 m. alta interdum ad 30 m. alta, trunco ad 1 m. raro ad 1·75 m. diametro; rami adscendentes vel patentes, ramulis primo fulvo-tomentosis demum atrobrunneis et glaucescentibus. *Folia* sempervirentia, oblonga, oblongo-obovata vel late lanceolata, apice acuta, subacuta vel breviter acuminata, interdum rotundata, basi plus minusve rotundata, interdum cuneata, raro leviter cordata, serrata vel serrulata, interdum repanda vel integerrima, 5–12 cm. longa, 2–7 cm. lata, coriacea, leviter rugosa, margine incrassata et revoluta, primo dense fulvo-stellato-tomentosa, maturitate supra glabra et nitida vel parce stellato-tomentosa, demum utrinque glabrescentia, infra interdum glaucescentia, costa et nervis primariis infra prominentibus; petiolus crassus, tomentosus, 0·5–1·8 cm. longus; stipulae oblongo-obovatae vel lineari-lanceolatae, brunneae, scariosae, pilosae. *Amenta* ex axillis foliorum hornotinorum orta, erecta vel adscendentia, densiflora, tomentosa, omnino mascula vel superiora basi flores femineos paucos gerentia, 5–10 cm. longa. *Flores masculi* in fasciculis 3-floris aggregati, ex axillis bractearum ovatarum orti. *Perianthium* tomentosum, 5–6-lobatum; lobi ovato-elliptici vel subtriangulares, obtusi vel subacuti. *Stamina* saepe 10–12; filamenta gracillima, perianthio multo longiora; antherae subglobosae, minimae. *Ovarii rudimentum* pilosum. *Flores feminei* solitarii, in axillis bractearum acutarum. *Perianthium* 6-lobatum, lobis rotundatis. *Stamina* 6, antheris sterilibus. *Styli* 3, raro plures, elongati, teretes, leviter recurvi, basi hirsuti. *Fructus* solitarii vel 2–3. *Pedunculus* crassus, tomentosus, ad 2·5 cm. longus. *Cupula* breviter poculiformis, 1·5–2 cm. lata, intus dense rufo-velutina, extra squamis longis linearibus patentibus vel recurvis sericeis tecta. *Glans* subovoidea vel subglobosa, apice acuta vel rotundata, basi lata, 2–3 cm. longa, 2–2·5 cm. lata, dense flavo-tomentosa, demum glabra; pericarpium lignosum, crassum.—*Q. echinacea*, Torrey, Pacific R. R. Rep. vol. iv. pt. 1, p. 137, t. 14. *Pasania densiflora*, Örsted, Vidensk. Medd. Kjöbenh. 1866, p. 83; Sargent, Trees N. Amer. p. 225, fig. 185; Jepson, Fl. Calif. 362, et Silva Calif. p. 235, tt. 7 & 73.—S. A. Skan.

Quercus densiflora was first discovered by David Douglas. His specimen in the Kew Herbarium is not precisely localised, but according to Hooker and Arnott it was in the Californian collection made by Douglas chiefly at Monterey and San Francisco. From Professor Sargent we learn that the species is distributed from the valley of the Umpqua River in Southern Oregon southward through coast ranges to the Santa Inez Mountains, east of Santa Barbara, California, and along the western slopes of the Sierra Nevada to Mariposa County. In the Sierra Nevada it ascends to an elevation of 4,000 feet above sea-level. It is exceedingly abundant in the humid Californian coast region north of San Francisco Bay, and attains its largest size in the Redwood forests of Napa and Mendocino Counties. The species is very variable in habit and in its leaves, sometimes occurring as a low spreading shrub only 1 to 10 ft. high, with small entire leaves. This has been distinguished as var. *echinoides*, Sargent (= var. *montana*, Mayr = *Q. echinoides*, R. Br., Campst.). *Pasania densiflora*, forma *lanceolata*, Jepson, Silva Calif. 237, has lanceolate entire or nearly entire leaves $2\frac{1}{2}$–$3\frac{1}{2}$ in. long.

The wood of this oak, though hard and strong, is brittle and is of little value except for fuel, but its bark is very rich in tannin and is used in enormous quantities for tanning leather. Professor Jepson states that in 1907 the annual tan harvest was about 25,000 cords, and to obtain this amount 100,000 trees were sacrificed every year, most of them being left in the forest to decay or to be consumed in the first forest fire. Best known as the Tan Oak, it is sometimes called Burr Oak and often Chestnut Oak, and locally Squaw Oak and Sovereign Oak. The species is of great interest as being the solitary representative in the New World of the section *Pasania*, often regarded as a genus distinct from *Quercus*, which comprises about 100 species nearly all of which are confined to South-eastern Asia. Its dense erect or sub-erect catkins, resembling those of *Castanea*, small anthers with pollen-grains much smaller than in *Quercus* proper, and woody thick pericarp are salient characters by which it may easily be distinguished from all other American oaks.

Notwithstanding the unusual interest of this tree it is one of the rarest of cultivated oaks. Two trees at Kew, if we except some young plants recently raised, appear to be the sole representatives of *Q. densiflora* in this country. From the larger of these material for our figure was obtained. This tree was raised from a packet of acorns received from Professor Sargent in 1874, and is growing in the Oak Collection near the southern end of the Rhododendron Dell. In some respects *Q. densiflora* is the most attractive of all the hardy evergreen oaks. The young leaves are covered on the lower surface with a thick tomentum which is at first milk-white, becoming tawny with age. The stout parallel ribs are also very distinctive. The tree is very leafy, almost luxuriant in aspect, yet it is slow-growing, and the larger of the two specimens at Kew, now over forty years old, is only 27½ feet high, its trunk at 3 feet from the ground being 2¼ feet in girth. In July, 1897, this tree was 14 feet high and 7 inches in girth. Like all oaks, *Q. densiflora* likes a good loamy soil. It transplants extremely badly—a fact which may help to account for its rarity. It is safest to grow it in pots until it is large enough to plant out in a permanent place, which should be done as soon as possible. Care must also be taken that its roots do not become pot-bound. Its leaves persist for three or four years, and its fruits ripen at the end of the second year. These, however, cannot be relied on in this country for propagation. It must be raised in the first instance from imported seeds.

DESCRIPTION.—*Tree*, often 50-80 ft., sometimes 100 ft. high, trunk usually 3½ ft., occasionally 5 ft. thick; branches ascending or spreading; twigs at first tawny tomentose, at length dark brown and glaucescent. *Leaves* evergreen, oblong, oblong-obovate or broadly lanceolate, acute, subacute or shortly acuminate, sometimes rounded, base more or less rounded, sometimes cuneate, rarely shallowly cordate, margin serrate or serrulate, sometimes repand or quite entire, 2–5 in. long, ¾–2¾ in. wide, coriaceous, slightly rugose, the edges thickened and revolute, at first densely clothed with tawny stellate hairs, when mature glabrous and shining or sparingly stellate-tomentose above, at length nearly glabrous on both surfaces, beneath occasionally somewhat glaucescent, the mid-rib and main nerves prominent beneath; potiole stout, tomentose, ⅕–¾ in. long; stipules oblong-obovate or linear-lanceolate, brown, scarious, pilose. *Catkins* borne in the axils of leaves of the current season, erect or ascending, dense-flowered, tomentose, either wholly male or with the uppermost bearing a few basal female flowers, 2–4 in. long. *Male flowers* clustered in groups of 3, in the axils of ovate bracts. *Perianth* tomentose, 5–6-lobed, the lobes ovate-elliptic or nearly triangular, obtuse or somewhat acute. *Stamens*

often 10–12; filaments very slender, much exceeding the perianth; anthers subglobose, very small. *Rudimentary ovary* pilose. *Female flowers* solitary, in the axils of acute bracts. *Perianth* 6-lobed, the lobes rounded. *Stamens* 6, their anthers sterile. *Styles* 3, rarely more, elongated, terete, slightly recurved, hirsute at the base. *Fruits* solitary, or 2–3 together. *Peduncle* stout, tomentose, up to 1 in. long. *Cupule* shortly goblet-shaped, $\frac{2}{3}$–$\frac{3}{4}$ in. wide, within densely red velvety, clothed outside with long linear spreading or recurved silky scales. *Acorn* subovoid or subglobose, tip acute or rounded, base broad, $\frac{3}{4}$–$1\frac{1}{4}$ in. long, $\frac{3}{4}$–1 in. across, densely yellow tomentose, at length glabrous; shell woody, thick.

Tab. 8695.—Fig. 1, male flowers; 2, female flowers; 3, section of a female flower, showing the sterile stamens; 4, young fruit; 5, mature fruit:—*all enlarged except* 4 *and* 5, *which are of natural size.*

M.S. del. J.N. Fitch. lith.

Vincent Brooks, Day & Son lith.

L. Reeve & Co. London.

Tab. 8696.

RHODODENDRON discolor.

Western China.

Ericaceae. Tribe Rhodoreae.

Rhododendron, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 599.

Rhododendron (§ Eurhododendron) **discolor**, *Franch. in Journ. de Bot.* vol. ix. p. 391 (1895); *Hemsl. et E. H. Wils. in Kew Bull.* 1910, p. 112; *Rehder et Wils. in Sargent, Pl. Wilson.* vol. i. p. 542; *Bean, Trees & Shrubs*, vol. ii. p. 353; species foliis magnis eglandulosis, floribus albis speciosissimis, filamentis glabris, ovario styloque ubique glandulosis distincta.

Frutex robustus, usque ad 2 m. altus; ramuli ultimi teretes, apicem versus circiter 1·5 cm. crassi, glabri, leviter nitidi. *Folia* magna elongato-elliptica vel oblongo-elliptica, utrinque obtusa apice mucronata, 15–30 cm. longa, 6–8 cm. lata, tenuiter coriacea, supra fusco-viridia et immerso-reticulata, infra eglandulosa, cinerea et conspicue tenuiter reticulata, areis reti venularum circumclusis leviter elevatis; costa supra plana, infra basin versus valde conspicua, circiter 5 mm. lata, apicem versus sensim attenuata; nervi laterales utrinsecus 15–18, graciles, flexuosi, supra immersi, infra vix prominuli, marginem versus valde ramosi; petioli robusti, 2–3 cm. longi, supra plani, 6–7 mm. lati, glabri. *Gemmae* laterales (foliiferae) saepius plures, subcylindricae, 6–7 cm. longae, medio circiter 1·5 cm. diametro; squamae ab extremo sensim longiores, exteriores late ovatae, acutae, circiter 1 cm. longae, minutissime ciliolatae, interiores elongato-oblanceolatae, acutae, 5–6 cm. longae, 1–1·3 cm. latae, tenuiter chartaceae, ciliolatae, utrinque glabrae. *Inflorescentia* terminalis, magna, 8–10-flora, 20–25 cm. expansa; axis 2·5-3 cm. longus, glaber; pedicelli demum subnutantes, 2·5–3 cm. longi, glabri. *Calyx* obsoletus, undulatus, margine glandulis sessilibus ornatus, extra glaber. *Corolla* alba, late infundibuliformis, limbo usque ad 12 cm. expanso; tubus a basi sensim ampliatus, 3·5 cm. longus, apice circiter 4 cm. diametro, striatus, glaber; lobi 6–7 oblongo-semiorbiculares, apice rotundati et leviter emarginati, 3–4 cm. longi, 3 cm. lati. *Stamina* plerumque 14, subaequalia, leviter exserta; filamenta inferne complanata, glabra; antherae pallide flavae, 4·5 mm. longae. *Ovarium* 8-loculare, stipitato-glandulosum; stylus longe exsertus, ubique glandulis sessilibus ornatus, stigmate magno capitato-indusiformi coronatus.—J. Hutchinson.

The fine Rhododendron here figured is a native of western Hupeh, where, according to Mr. E. H. Wilson, to whose efforts its introduction is due, it is the common species of woods up to an elevation of 8,000 feet. It is readily recognised, in the group with glabrous leaves to which it belongs, by its large white flowers with glabrous

filaments and rather densely glandular style. In beauty and fragrance it is equal to any of its immediate allies, and is further readily distinguished from these by the valuable cultural character of being the latest in its group to flower. As compared with the related *R. Fortunei*, Lindl., figured at t. 5596 of this work, which flowers in May, *R. discolor* does not come into blossom until the middle of June, a season when few Rhododendrons of either wild or garden origin are to be found in bloom. Our plant also possesses another character valuable in this country, in being late of starting into growth; with the exception of *R. auriculatum*, Hemsl., from Central China, it is probably the latest. This renders it free from the danger of late frosts; so far as ordinary winter cold is concerned it is also perfectly hardy. The plant which provided the material for our plate was raised at Kew from seed collected by Wilson in autumn in 1908, received from the Arnold Arboretum early in 1909.

DESCRIPTION.—*Shrub* of robust habit, 6–8 feet high; terminal twigs cylindric, about $\frac{2}{3}$ in. thick near the tips, glabrous, somewhat polished. *Leaves* large, elongate- or oblong-elliptic, obtuse with a mucronate tip, base rounded, 6–12 in. long, $2\frac{1}{2}$–$3\frac{1}{4}$ in. wide, thinly leathery, above tawny-green with impressed nervation, beneath without glands, ashy grey, distinctly finely reticulated and with the spaces enclosed within the reticulations slightly raised; midrib flat above, very visible towards the base beneath and there nearly $\frac{1}{5}$ in. wide, gradually narrowed upwards; lateral nerves 15–18 along each side, slender, sunk above and rather indistinct beneath, much branched towards the leaf-margin; petiole stout, $\frac{3}{4}$–$1\frac{1}{4}$ in. long, flat above, about $\frac{1}{4}$ in. thick, glabrous. *Flower-buds* lateral, often several together, subcylindric, about 3 in. long, $\frac{2}{3}$ in. wide; scales gradually longer from without inwards, the outermost wide ovate, acute, about $\frac{1}{3}$ in. long, finely ciliolate, the inmost elongate-oblanceolate, acute, 2–$2\frac{1}{4}$ in. long, up to $\frac{1}{2}$ in. wide, thinly papery, ciliolate on the edges, glabrous on both sides. *Inflorescence* terminal, large, 8–10-flowered, 8–10 in. across; axis 1–$1\frac{1}{4}$ in. long, glabrous; pedicels at length nodding, 1–$1\frac{1}{4}$ in. long, glabrous. *Calyx* obsolete, undulate, with sessile marginal glands, glabrous outside. *Corolla* white, wide funnel-shaped, limb up to $4\frac{3}{4}$ in. across, tube gradually widened from the base, $1\frac{1}{2}$ in. long, about $1\frac{3}{4}$ in. wide at the top, striate, glabrous; lobes 6–7, oblong-orbicular, slightly emarginate, $1\frac{1}{4}$–$1\frac{3}{4}$ in. long, $1\frac{1}{4}$ in. wide. *Stamens* usually 14, subequal, slightly exserted; filaments flattened below, glabrous; anthers pale yellow, $\frac{1}{6}$–$\frac{1}{5}$ in. long. *Ovary* 8-celled, beset with stalked glands. *Style* far-exserted, clothed throughout with sessile glands; stigma large, mantle-like, capitate.

TAB. 8696.—Fig. 1, tip of leaf; 2, calyx and pistil; 3 and 4, stamens; 5, section of ovary:—*all enlarged.*

H.S del. J.N.Fitch lith

. L.Reeve & C.º London

Tab. 8697.

MAURANDIA Purpusii.

Mexico.

Scrophulariaceae. Tribe Antirrhineae.

Maurandia, *Ort.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 935.

Maurandia Purpusii, *T. S. Brandegee in Zoe*, vol. v. p. 256; *A. Purpus in Möllers Deutsche Gärtn.-Zeit.* vol. xxviii. p. 446 cum figuris; species vix scandens *M. erubescenti*, A. Gray, proxima, sed planta minus glanduloso-pubescente, corollae multo minoris tubo superne minus ampliato differt.

Herba perennis fere ubique breviter glanduloso-pubescens, radicibus basique caulis valde incrassatis et carnosis. *Caules* graciles, adscendentes vel prostrati, vix scandentes, metrales. *Folia* alterna, petiolata, late triangulari-ovata, apice acuta, basi profunde cordata, irregulariter dentata vel crenata vel interdum fere integra, 3·5–4·5 cm. longa, basi 4–5 cm. lata; petiolus 3–4·5 cm. longus. *Flores* speciosi, longe pedunculati, in axillis foliorum superiorum solitarii. *Pedunculi* adscendentes, graciles, 7–10 cm. longi, saepissime foliis longiores. *Calyx* herbaceus, fere ad basin 5-partitus; lobi oblongo-ovati, apice subrotundati et apiculati, basi cordati, 1·5–1·7 cm. longi, 8–9 mm. lati. *Corolla* vivide roseo-purpurea, 3·5–4 cm. longa, extra fere glabrata; tubus tubuloso-infundibuliformis, basi antice paulum ventricosus, superne gradatim et leviter ampliatus, 3·5–4 cm. longus, apice 1·5 cm. latus, intus praesertim basi glanduloso-pubescens; limbus patens, leviter 2-labiatus, subaequaliter 5-lobus, ad 2·5 cm. latus; lobi suborbiculares, 7–10 mm. lati. *Semina* 4, duo longiora vix exserta; filamenta dense glanduloso-pubescentia. *Ovarium* conicum, ut stylus staminibus brevioribus aequilongus apice integer, glanduloso-pubescens. *Capsula* ellipsoidea, apice rotundata, basi inaequalis, 12–13 mm. lata, calyce paulum brevior, stylo persistente coronata. *Semina* suborbicularia, circiter 3 mm. lata, tuberculata, ala striata dentata vel sinuata (emarginata) circumdata.—S. A. Skan.

This attractive plant was discovered by Mr. C. A. Purpus in the Sierra de Mixteca, Oaxaca, Mexico. He saw it in only one locality, and that was on the slopes of the Cerro de la Yerba, growing on limestone rocks and on the walls of old ruins. As seen in nature, with its growths hanging over the rocks and bearing numerous showy flowers, it presented a striking object. Seeds were sent to the Darmstadt Botanic Garden, from which some were received at Kew in 1912, and plants raised from these flowered in the Temperate House for the first time in July, 1915, supplying material for the present illustration. In the original description the peduncles are said to be only about two inches long, and the photographs in Möllers Deutsche Gärtner-Zeitung of

plants which flowered in the nursery of Mr. Herb of Naples represent peduncles about as long as the petioles, though in the text the flowers are described as being long-stalked. The peduncles in the Kew plants were three to four inches long. This is probably due to indoor cultivation. Mr. A. Purpus recommends the plant for sunny, dry places. Protected from wet, the tuberous rootstocks survived the winter out of doors at Darmstadt. The species is described as non-climbing. At Kew the stems have reached a length of about 3 ft. and do not show the tendency to climb by means of the petioles met with in most Maurandias; *M. Purpusii* differs markedly in this respect from its close ally, *M. erubescens*. Only one species, *M. erecta*, Hemsl., so far as is known, has a distinctly erect self-supporting stem. The genus *Maurandia* comprises eight species (or seven if *M. geniculata*, Robinson & Fernald, be referred to *M. erecta*, which it resembles very closely) all of which are natives of Mexico, one, *M. Wislizenii*, Engelm., extending to New Mexico. *M. erubescens* and *M. semperflorens*, Ort., have become naturalised in some of the West Indian Islands and in some parts of Tropical America. These two species and *M. scandens*, A. Gr., are figured in this Magazine at tt. 460, 3037, 3038 and 3650.

Description.—*Herb*, perennial, shortly glandular-pubescent; base of stem and roots thick and fleshy. *Stem* slender, ascending or prostrate, hardly scandent, 3–4 ft. long. *Leaves* alternate, petioled, wide triangular-ovate, acute, base deep-cordate, irregularly toothed or crenate, at times nearly entire, $1\frac{1}{2}$–$1\frac{3}{4}$ in. long, $1\frac{1}{2}$–2 in. wide at the base; petiole $1\frac{1}{4}$–$1\frac{3}{4}$ in. long. *Flowers* showy, long-stalked, solitary in the upper axils; peduncles ascending, slender, 3–4 in. long, usually longer than the leaves. *Calyx* herbaceous, 5-partite almost to the base; lobes oblong-ovate, rather rounded and apiculate, base cordate, about $\frac{2}{3}$ in. long, $\frac{1}{3}$ in. wide. *Corolla* bright rose-purple, $1\frac{1}{4}$–$1\frac{1}{2}$ in. long, almost glabrous externally; tube narrow-funnel-shaped, slightly swollen at the base in front, glandular-pubescent within, especially at the base; limb patent, 2-lipped, almost equally 5-lobed, about 1 in. across; lobes suborbicular, about $\frac{1}{3}$ in. wide. *Stamens* 4, in two pairs, hardly exserted; filaments densely glandular-pubescent. *Ovary* conical, glandular-pubescent like the style which is shorter than the stamens and is entire at the tip. *Capsule* ellipsoid, rounded above, unequal at the base, about $\frac{1}{2}$ in. wide, rather shorter than the calyx, tipped by the persistent style. *Seed* almost orbicular, about $\frac{1}{8}$ in. wide, tuberculate, with a surrounding emarginate, striate, toothed or sinuate wing.

Tab. 8697.—Fig. 1, calyx in longitudinal section, showing the pistil; 2, base of corolla, laid open, showing the stamens; 3 and 4, anthers; 5, group of hairs from base of stamens; 6, transverse section of ovary; 7, capsule; 8 and 9, seeds:—*all enlarged except* 8, *which is of natural size.*

M.S. del. J.N.Fitch. lith.

Vincent Brooks, Day & Son Lt.d imp.

L. Reeve & Co. London

Tab. 8698.

SENECIO Monroi.

New Zealand.

Compositae. Tribe Senecionideae.

Senecio, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 446.

Senecio Monroi, *Hook. f. Fl. Nov. Zel.* vol. ii. p. 333 (1855), *et Handb. N.Z. Fl.* p. 162 (1864); *Kirk, Students' Fl.* p. 348 (1898); *Cheeseman, Man. New Zeal. Fl.* p. 380 (1906); affinis *S. laxifolio*, Buch., sed foliis minoribus marginibus crasse undulatis, pedunculis brevioribus et involucri bracteis haud canescentibus differt.

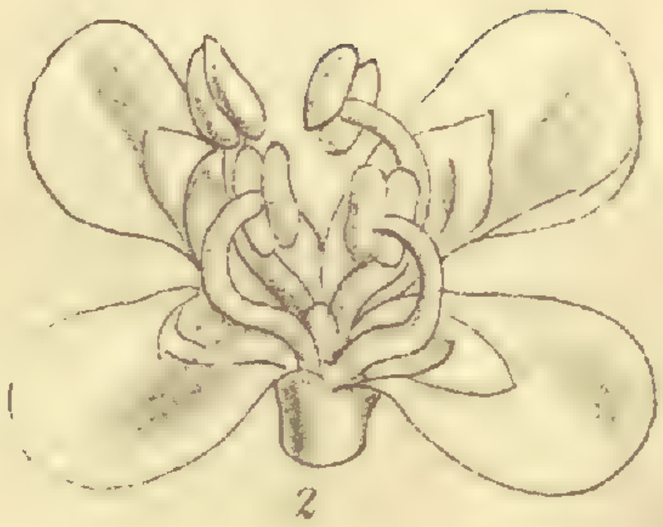
Frutex ramosissimus usque ad 2 m. altus; ramuli dense foliati, breviter albo-lanati. *Folia* petiolata, oblonga vel oblongo-lanceolata, apice obtusa, basi sensim angustata, 1·5–2·5 cm. longa, usque ad 1 cm. lata, margine incrassato et conspicue undulato-crenato, crasse coriacea, supra tenuiter reticulata et leviter viscida, infra breviter albo-lanata, enervosa, costa conspicua; petioli 0·5–1 cm. longi, basi incrassati, semiamplexicaules, albo-lanati. *Capitula* laxe corymbosa, pedunculata, 2–2·5 cm. expansa; pedunculi gracillimi, glanduloso-puberuli, 2–3 cm. longi. *Involucri bracteae* 2-seriatae, lineares, acutae, exteriores 0·7 cm. longae, interiores paullo longiores, subherbaceae, extra breviter pubescentes. *Flores radii* 12–14, flavi; corollae tubus anguste cylindricus, 4 mm. longus, apicem versus parce pubescens; lamina oblongo-lanceolata, apice tridentata, 5-nervia, 7 mm. longa, 2·5 mm. lata. *Flores disci* numerosi; corollae tubus inferne anguste cylindricus, superne paullo ampliatus, 0·5 cm. longus; lobi 5, lanceolati, subacuti, apice minute et parce pubescentes. *Achaenia* subteretia, breviter pubescentia. *Pappus* albus, amplus, 5 mm. longus, barbellatus.—J. Hutchinson.

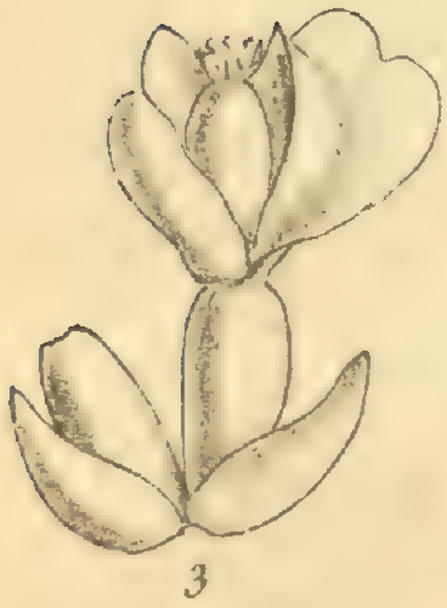
The genus *Senecio* is represented in New Zealand by some thirty species which vary in habit from small weeds resembling the Groundsel of our gardens to much-branched shrubs with leathery leaves like *S. Monroi*, the subject of our illustration. This species, which is confined in a wild state to the South Island of New Zealand, where it flowers from December to January, along with a few others bears considerable resemblance in habit and appearance to some of the species of *Olearia*, Moench, so characteristic of New Zealand, but is readily distinguished by the fewer involucral bracts as well as by the different style-arms, which in *Olearia* exhibit the

characters that mark the tribe *Asteroideae*. *S. Monroi* was first sent to Kew in 1905 by Mr. G. Matthews, Dunedin; at Kew it is grown in the cool greenhouse and flowers in autumn. The material for our figure came from the garden at Ludgvan Rectory, Long Rock, Cornwall, where, the Rev. Mr. Boscawen informs us, it was raised by him from seed sent to him from New Zealand in 1907. At Ludgvan the plant grows well in any ordinary garden soil and flowers freely; some of Mr. Boscawen's examples are now compact bushes three feet in height and about four feet through.

Description.—*Shrub*, much branched, 6–7 ft. high; twigs densely leafy, shortly white woolly. *Leaves* petioled, oblong or oblong-lanceolate, obtuse, gradually narrowed to the base, $\frac{2}{3}$–1 in. long, about $\frac{1}{3}$ in. wide, margin thickened and distinctly undulate-crenate, thickly leathery, above finely reticulately veined and slightly viscid, beneath shortly white woolly, midrib raised but venation otherwise not visible; petiole $\frac{1}{5}$–$\frac{2}{5}$ in. long, with a thickened partly stem-clasping base, white woolly. *Heads* laxly corymbose, peduncled, $\frac{3}{4}$–1 in. across; peduncles slender, glandular-puberulous, $\frac{3}{4}$–$1\frac{1}{4}$ in. long; bracts of the involucre 2-seriate, linear, acute, the outer over $\frac{1}{4}$ in. long, the inner rather longer, somewhat herbaceous, shortly pubescent externally. *Ray-florets* 12–14, yellow; corolla-tube narrow cylindric, $\frac{1}{6}$ in. long, sparingly pubescent towards the tip; limb oblong-lanceolate, tip 3-dentate, 5-nerved, over $\frac{1}{4}$ inch long, $\frac{1}{10}$ in. wide. *Disk-florets* numerous; corolla-tube narrow-cylindric below, slightly widened upwards, $\frac{1}{5}$ in. long, glabrous; lobes 5, lanceolate, somewhat acute, finely and sparingly pubescent at the tip. *Achenes* almost terete, shortly pubescent. *Pappus* white, copious, $\frac{1}{5}$ in. long, barbellate.

Tab. 8698.—Fig. 1, a leaf; 2, a capitulum; 3, a ray-floret; 4, a pappus-seta; 5, a disk-floret; 6, anthers; 7, style-arms:—*all enlarged.*





Tab. 8699.

PILEA Forgeti.

Venezuela.

Urticaceae. Tribe Urticeae.

Pilea, *Lindl.*; *Benth. et Hook. f. Gen. Plant.* vol. iii. p. 384.

Pilea Forgeti, *N. E. Br.*; species nova ex affinitate *P. semidentatae*, Wedd., sed humilior, et ab ea foliis obtusioribus crenato-dèntatis pulchre coloratis et cymis masculis dense capitato-corymbiformibus differt.

Herba dioica, 10–15 cm. alta, basi ramosa. *Caules* 4–5 (siccati 2) mm. crassi. tenuiter adpresse pubescentes, rubri. *Folia* opposita, aequalia vel inaequalia; petiolus 0·6–1·5 cm. longus, tenuiter adpresse-pubescens, ruber; lamina 2–10 cm. longa, 1·2–2·8 cm. lata, elliptica ad elongato-lanceolata, obtusa vel subacuta, basi obtusa vel leviter cordata, crenato-dentata, trinervia, supra glabra, rubro-brunnea, vittis tribus viridibus notata, subtus secus nervos adpresse pubescens ceterum glabra, purpurea venis viridibus. *Stipulae* 1–2 cm. longae, 5–6 mm. latae, ovato-lanceolatae, obtusae, glabrae, virides, costa rubra. *Cymae* oppositae; masculae dense capitato-corymbiformes, 3–4 cm. diametro, pedunculo 6–7 cm. longo rubro laxe pubescente suffultae; foemineae inconspicuae, petiolos subaequantes, 1–1·5 cm. diametro, floribus densissime congestis, pedunculo 3–4 mm. longo suffultae. *Flores* masculi albi; sepala 4, subaequalia, 3 mm. longa, 1·5–2·5 mm. lata, basi concavo-cucullata, superne vel dorso aliformia; stamina 4, alba; flores femini minuti, fusco-virides; sepala 3, inaequalia, 0·5–0·75 mm. longa, unum late obovato-obtusum, duo lanceolata subacuta membranacea; ovarium compresso-ellipsoideum; stigma sessile, capitatum. —N. E. Brown.

The Urticaceous genus *Pilea* includes over two hundred species dispersed throughout the tropics of both hemispheres. Of these the best known is the tiny *P. muscosa*, Lindl., the 'gunpowder plant,' so-called from the cloud of pollen discharged from the anthers when the plant is shaken—a common South American species which has become introduced into India, and even into Australia where alone no native *Pilea* occurs. Very few species are in cultivation, the only ones to be met with in collections so far being *P. grandis*, Wedd., a native of Jamaica, with large green, dentate leaves in shape recalling those of a *Coleus*, and *P. Spruceana*, Wedd., a native of Peru, with ovate dark bronze-green foliage. To these have now to be added the attractive foliage

plant which is here figured. This species, *P. Forgeti*, was discovered in Venezuela by Mr. L. Forget in 1914, when collecting on behalf of Messrs. F. Sander and Sons, St. Albans, by whom it has been introduced to cultivation. The dwarf habit with bright bronze foliage striped with green give it a pleasing appearance when out of flower. The sexes are distinct, and in the case of the female plant, in which the flowers are inconspicuous and hidden away in small dense clusters in the axils of the leaves, the general facies of the plant remains unchanged. In the case of the male, however, flowering adds to the charm of the plant owing to the development of pairs of dense clusters of small white flowers raised on long pink stalks well above the foliage. Like the few species already in cultivation, *P. Forgeti* is easily grown in a tropical house, and like them sets seeds in abundance.

DESCRIPTION.—*Herb*, dioecious, 4–6 in. high, branching at the base. *Stems* about $\frac{1}{8}$ in. thick, sparingly adpressed-pubescent, red. *Leaves* opposite, equal or not; petiole $\frac{1}{4}$–$\frac{2}{3}$ in. long, sparingly adpressed-pubescent, red; blade $\frac{3}{4}$–4 in. long, $\frac{1}{2}$–$1\frac{1}{8}$ in. wide, from elliptic to elongated lanceolate, obtuse to slightly acute, base rounded to slightly cordate, margin crenately toothed, 3-nerved, glabrous above, bronze-coloured with 3 longitudinal green bands, beneath adpressed-pubescent on the nerves, glabrous elsewhere, purple with the venation green; stipules ovate-lanceolate, obtuse, $\frac{1}{3}$–$\frac{3}{4}$ in. long, about $\frac{1}{4}$ in. wide, glabrous, green with a red midrib, *Cymes* opposite; male densely capitate-corymbose, $1\frac{1}{4}$–$1\frac{3}{4}$ in. across; peduncle $2\frac{1}{2}$–3 in. long, pink, laxly pubescent; female inconspicuous, about as long as the petioles, $\frac{1}{3}$–$\frac{2}{3}$ in. across, dense; peduncle $\frac{1}{8}$–$\frac{1}{6}$ in. long. *Flowers* small; male white; sepals 4, nearly equal, $\frac{1}{8}$ in. long, $\frac{1}{10}$ in. wide or narrower, concave cucullate at the base, above and on the back wing-shaped; stamens 4, white; female greenish-tawny; sepals 3, unequal, under $\frac{1}{16}$ in. long, one wide, obovate-obtuse, two lanceolate, somewhat acute, membranous; ovary compressed-ellipsoid; stigma sessile, capitate, papillate.

TAB. 8699.—Fig. 1, male flower, seen from the side; 2, the same, showing stamens; 3, female flower; 4, pistil:—*all enlarged*.

M.& del J.N Fitchlith.

Vincent Brooks Day & Son Lt.d imp

J. Reeve & Co. London.

Tab. 8700.

ANGULOA Cliftonii.

Colombia.

Orchidaceae. Tribe Vandeae.

Anguloa, *Ruiz et Pav.*; *Benth. et Hook. f. Gen. Plant.* vol. iii. p. 548.

Anguloa Cliftonii, *Rolfe in Kew Bull.* 1910, p. 160; *Gard. Chron.* 1910, vol. xlvii. p. 77; *Journ. Hort.* 1910, vol. i. p. 117, cum icon; *Gard. Mag.* 1910, pp. 83, 84, cum icon.; *Orchis*, vol. viii. t. 3; *Orch. Rev.* 1912, p. 293; ab omnibus speciebus hujus generis labello unguiculato profunde trilobo medio saccato differt.

Herba terrestris, 30–40 cm. alta; pseudobulbi aggregati, ovoideo-oblongi, 11–15 cm. longi; 4·5–6·5 cm lati, 2–3-phylli. *Folia* elliptico-oblonga, breviter acuminata, subundulata, plicata, basi attenuata, 15–30 cm. longa, 7–9 cm. lata. *Scapi* erecti, crassiusculi, 20–25 cm. longi, vaginis spathaceis amplis subimbricatis obtecti; bracteae elliptico-lanceolatae, acutae, concavae, 5–6 cm. longae. *Flores* magni, subglobosi. *Sepalum* posticum elliptico-oblongum, subobtusum, incurvum, valde concavum, circiter 10 cm. longum, 5 cm. latum; sepala lateralia orbiculari-elliptica, concava, apice angustata et falcato-incurva, subacuta, 7·5 cm. longa, 4 cm. lata, basi breviter connata et pedi columnae adnata. *Petala* orbiculari-ovata, valde concava, apice angustata, subobtusa, 7·5 cm. longa, 4·5 cm. lata. *Labellum* unguiculatum, circiter 4 cm. longum; unguis ligulatus, 1 cm. longus; limbus trilobus, basi saccatus; saccus 2 cm. latus; lobi laterales falcato-incurvi, oblongi, breves, obtusi, circiter 6 mm. longi; lobus intermedius late unguiculatus; unguis 8 mm. longus, basi callo bilobo vel obcordato instructus; limbus basi trulliformis vel triangularis, pubescens, apice recurvus, acuminatus. *Columna* crassissima, 3·5 cm. longa, subreflexa, prominenter gibbosa, deinde basi subito reflexa et facie concava, infra antheram constricta; alae latae, subtruncatae; stigma marginatum, valde concavum.—*Anguloa Ruckeri*, var., Ledien in Orchis, vol. iv. p. 119, t. 3; non Lindl.—R. A. Rolfe.

The handsome *Anguloa* here figured was introduced to cultivation by Messrs. Charlesworth and Company, Haywards Heath, in whose nursery it flowered in July, 1910, the plant passing into the collection of Mr. J. Talbot Clifton, Lytham Hall, Lancashire, to whom it was dedicated in the original description. A few years later a fresh importation was effected by Messrs. F. Sander and Sons, St. Albans. This species, *A. Cliftoni*, differs markedly from the previously known members of its genus in having a deeply saccate base to the lip, which

has a narrow strongly recurved frontal lobe, and in the shorter column which is constricted below the apex and much swollen above the base. The locality of the original plant has not been stated, but the species is known to occur in the district of Antioquia in Colombia. The material for our figure has been obtained from a plant imported by Messrs. Sander. Like other members of the genus, *A. Cliftoni* thrives in the intermediate house. It is most suitably grown in a compost of turfy loam and peat, with a small proportion of chopped sphagnum added to the mixture. During the growing season the plant requires a liberal supply of moisture at the roots and should be kept shaded from bright sunshine. When at rest only sufficient water should be given to keep the pseudobulbs plump; the plant may then be given a brighter and more airy situation, thus ensuring the ripening required to induce satisfactory flowering.

Description.—*Herb*, terrestrial, 1–1½ ft. high; pseudobulbs clustered, ovoid-oblong, 4–6 in. long, 1¾–2¾ in. wide, 2–3-foliate. *Leaves* elliptic-oblong, shortly acuminate, margin slightly wavy, plaited, narrowed to the base, 6–12 in. long, 3–3¾ in. wide. *Scapes* erect, rather stout, 8–10 in. long, clothed with large, spathaceous, somewhat imbricate sheaths; bracts elliptic-lanceolate, acute, concave, 2–2¼ in. long. *Flowers* large, subglobose. *Sepals*: posterior elliptic-oblong, somewhat obtuse, incurved, very concave, about 4 in. long, 2 in. wide; lateral orbicular-elliptic, concave, narrowed to the falcately recurved subacute tip, 3 in. long, 1½ in. wide, shortly connate and adnate at the base to the column. *Petals* orbicular-ovate, very concave, narrowed to the somewhat obtuse apex, 3 in. long, 1¾ in. wide. *Lip* clawed, about 1½ in. long; claw ligulate, over ⅓ in. long; limb 3-lobed, saccate at the base, the pouch ¾ in. across, lateral lobes falcately incurved, oblong, short, blunt, about ¼ in. long; mid-lobe broadly clawed, claw ⅓ in. long, with a 2-lobed or obcordate basal callus; limb trowel-shaped or triangular, pubescent, acuminate and recurved at the tip. *Column* very thick, 1⅓ in. long, somewhat reflexed, distinctly gibbous then suddenly reflexed at the base, and concave in front, narrowed under the anther; wings broad, somewhat truncate; stigma marginate, very concave.

Tab. 8700.—Fig. 1, lip and column; 2, lip, detached; 3, column, seen from in front; 4, anther-cap; 5, pollinarium; 6, sketch of an entire plant:—*all of natural size except* 6, *which is much reduced.*

M S del. J N Fitch lith.

Vincent Brooks Day & Son Ltd imp.

L Reeve & Co London

Tab. 8701.

BERBERIS Stapfiana.

China.

Berberidaceae. Tribe Berberideae.

Berberis, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. i. p. 43.

Berberis (§ Sinenses) **Stapfiana,** *C. K. Schneider in Kew Bull.* 1912, p. 35; *Bean, Trees & Shrubs*, vol. i. p. 249 (1914); affinis *B. subcaulialatae*, C. K. Schneider, et *B. Wilsonae*, Hemsl., sed ramulis minute pustulatis vel laevibus, baccis ellipsoideis haud globosis differt.

Frutex deciduus vel subsempervirens, glaber; rami fusco-purpurascentes, minute pustulati vel laeves, costati; spinae e basi tripartitae, graciles, acutissimae, fusco-stramineae, infra conspicue canaliculatae, 1·5–1·8 cm. longae, lateralibus e medio sub angulo 90° divergentibus. *Folia* ad 4–8-fasciculata, lineari-oblanceolata, apice plerumque acute mucronata, basi in petiolum brevem attenuata, integra vel rarius 2–3-dentata, 1·2–3 cm. longa, 3–5 mm. lata, rigide chartacea, utrinque praesertim in pagina superiore conspicue reticulata, supra viridia, infra paullo pruinosa et papillosa. *Inflorescentiae* brevissime fasciculato-racemosae, foliis multo breviores, 4–7-florae; pedicelli pruinosi, 2·5–4 mm. longi, basi bracteis late ovatis acutis coriaceis circiter 1·5 mm. longis instructi. *Flores* flavi, depresso-globosi, 6–7 mm. diametro. *Sepala* exteriora ovato-orbicularia, apice rotundata, 1·25–1·75 mm. longa, interiora orbicularia, 3–4 mm. diametro, 6-nervia. *Petala* obovata, 3 mm. longa, 1·5–1·75 mm. lata, basin versus angustata et biglandulosa. *Stamina* petalis breviora, connectivo producto subobtuso. *Ovarium* staminibus aequilongum, stigmate fere plano orbiculare coronatum. *Fructus* late ellipsoideus, kermesinus, leviter pruinosus, stigmate persistente breviter stipitato nigrescente incluso circiter 8 mm. longus.—J. Hutchinson.

The Barbery here described is one of a group of Chinese forms with dull foliage, among which *Berberis Wilsonae*, Hemsl., figured at t. 8414 of this work may be regarded as the type, but which includes also the very closely allied *B. subcaulialata*, C. K. Schneider. The species now figured was originally described by Dr. Schneider as *B. Stapfiana* from a plant in the Barbery collection at Kew, which had been presented by Mr. M. L. de Vilmorin in 1910 under the name *B. subcaulialata*, from which it differs in the characters pointed out by Mr. Hutchinson. The plant from which our illustration has been prepared is not, however, the original type of *B. Stapfiana*, but

one raised from seed collected by Mr. E. H. Wilson sent to Kew in 1909 from the Arnold Arboretum. The seed in both instances came from Western China; the precise locality is not known in either case. The long arching shoots, which are produced annually, impart to our plant a free and graceful habit; its being practically an evergreen affords an additional merit; it attains its greatest beauty in the fruiting condition, in October and November, later in the year perhaps than is the case with any other Barbery. It likes a good loamy soil and a sunny position; the abundant seeds render its propagation easy. How far the differences between the three plants with dull-grey foliage above alluded to may be specific seems open to doubt. In a recent communication Dr. Schneider has suggested that possibly both of the forms described by him as distinct may be varieties of the species described by Mr. Hemsley. While there is much to favour this view, the fact remains that *B. Wilsonae*, Hemsl., is readily distinguished by its downy twigs from the two plants described by Dr. Schneider, in both of which the twigs are devoid of hairs; of these two, *B. Stapfiana* differs further from *B. Wilsonae* as regards the form of its ripe fruits.

Description.—*Shrub*, about 5 ft. high; stem long, branches arching, ridged; twigs glabrous, tawny-purplish, finely pustulate or smooth; spines 3-partite from the base, slender, very acute, tawny-straw-coloured, distinctly channelled beneath, $\frac{2}{3}$–$\frac{3}{4}$ in. long, the lateral diverging from the main spine at a right angle. *Leaves* in clusters of 4–8, falling late, so that the plant is almost evergreen, linear-oblanceolate, usually sharply mucronate, narrowed below into a short petiole, entire or rarely 2–3-toothed, $\frac{1}{2}$–$1\frac{1}{4}$ in. long, $\frac{1}{8}$–$\frac{1}{5}$ in. wide, firmly chartaceous, glabrous, conspicuously reticulate especially on the green upper surface, below somewhat pruinose and papillose. *Inflorescences* of short clustered racemes, considerably shorter than the leaves, 4–7-flowered; pedicels pruinose, $\frac{1}{10}$–$\frac{1}{6}$ in. long, beset at the base with small wide-ovate acute coriaceous bracts. *Flowers* yellow, depressed-globose, about $\frac{1}{4}$ in. across. *Sepals*: outer ovate-orbicular, with rounded tips; inner orbicular, $\frac{1}{8}$–$\frac{1}{9}$ in. wide, 6-nerved, much larger than the outer. *Petals* obovate, $\frac{1}{8}$ in. long, about $\frac{1}{16}$ in. wide, narrowed to the base and there 2-glandular. *Stamens* shorter than the petals, with a somewhat bluntly produced connective. *Ovary* as long as the stamens, crowned by an almost flat orbicular stigma. *Fruit* wide ellipsoid, crimson and slightly pruinose, about $\frac{1}{3}$ in. long including the persistent, shortly stipitate, blackish stigma.

Tab. 8701.—Fig. 1, a leaf of unusual type, showing marginal teeth; 2, flower-bud; 3, a flower, fully open; 4, petal and stamen; 5, petal; 6, pistil; 7, fruit and bracts:—*all enlarged.*

M.S. del. J.N. Fitch lith.

Vincent Brooks, Day & Son Lit.ª imp

L. Reeve & Cº London

Tab. 8702.

CLEMATIS Fargesii, var. Souliei.

China.

Ranunculaceae. Tribe Clematideae.

Clematis, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. i. p. 3.

Clematis **Fargesii**, *Franch.*, var. **Souliei**, *Finet et Gagnepain in Bull. Soc. Bot. France*, vol. i. p. 523 (1903), *et Contrib. Fl. As. Or.* fasc. i. p. 8 (1905); *Rehder et Wils. in Sargent, Pl. Wilson.* pars iii. p. 336 (1913); a typo foliolis angustioribus basi late cuneatis vel rotundatis parce pubescentibus, filamentis antheris multo longioribus differt.

Frutex scandens; ramuli sulcati, juniores breviter tomentosi, demum parce pubescentes, rubro-purpurascentes. *Folia* biternata, usque ad 20 cm. longa et 15 cm. expansa, tenuiter chartacea, utrinque parce adpresse pubescentia; foliola lateralia terminali multo minora, plus minusve ovata, 2–3 cm. longa, 1–2 cm. lata, inaequaliter lobulato-dentata vel interdum sublobata, dentibus ovatis acute mucronatis; foliola terminalia sessilia vel petiolulata, ovato-lanceolata, subtriloba, acute acuminata, basi rotundata vel breviter cuneata, 3–5 cm. longa, 2–4·5 cm. lata; nervi supra impressi, infra prominentes, adscendentes, laxe ramosi. *Pedunculi* axillares, 1–2-flori, foliis plerumque multo breviores, supra medium bracteolati, parce pubescentes, bracteolis minimis oppositis; pedicelli ultimi 2·5–4·5 cm. longi, graciles. *Alabastra* ovoidea, obtusa, 1·5 cm. longa. *Sepala* 6, alba, extra flavo-tincta, obovata, apice acute mucronata, 2·5–3 cm. longa, 2–2·5 cm. lata, extra breviter pubescentia. *Stamina* glabra, stylis paullo longiora, filamentis linearibus complanatis vix 1 cm. longis, antheris 3–3·5 mm. longis dilute flavis. *Achaenia* numerosa, late ovoidea, compressa, glabra, apice in stylum dense villosum attenuata.—*Clematis Souliei*, Franch. ex Finet et Gagnepain, l.c., nomen.—J. Hutchinson.

The *Clematis* which forms the subject of our illustration is a native of western Szechuan, where it is found in woodlands, but where it appears to occur somewhat sparingly. At one time thought to be a distinct species, *C. Souliei*, Franch., it has recently been regarded as only a form of *C. Fargesii*, Franch., also a native of south-western China, and indeed to differ but slightly from that plant, as originally described, in having filaments considerably longer than the anthers, and perhaps also in having the leaflets more rounded or more widely cuneate at the base. *C. Fargesii* is a member of the *Vitalba* group of species; within that group it is readily

distinguished by its one- or two-flowered axillary peduncles and by its large and conspicuous flowers. The plant from which the material for our figure was obtained was raised at Kew from seeds received from the Arnold Arboretum in 1912. It flowered for the first time in 1915; the specimen figured was gathered in 1916. Plants continue in flower from June to September; they grow vigorously in a loamy soil, give every evidence of being hardy in our climate and develop sufficient seeds to make propagation easy. As a climbing shrub for gardens this *Clematis* will be valued for the pure whiteness and delicate satiny texture of its flowers.

Description.—*Shrub*, climbing; twigs sulcate, shortly tomentose when young, ultimately sparingly pubescent, reddish-purple. *Leaves* 2-ternate, up to 8 in. long, 6 in. wide, thinly chartaceous, sparingly adpressed-pubescent on both surfaces; lateral leaflets much smaller than the terminal, more or less ovate, $\frac{3}{4}$–$1\frac{1}{4}$ in. long, $\frac{1}{3}$–$\frac{3}{4}$ in. wide, unequally lobulately toothed or at times almost lobate, the teeth ovate, acute and mucronate; end-leaflet sessile or petiolulate, ovate-lanceolate, almost 3-lobed, acutely acuminate, base rounded or shortly cuneate, $1\frac{1}{4}$–2 in. long, $\frac{3}{4}$–$1\frac{3}{4}$ in. wide; nerves sunk above, raised beneath, ascending, laxly branched. *Peduncles* axillary, 1–2-flowered, usually much shorter than the leaves, bracteolate above the middle, sparingly pubescent, the bracteoles very small, opposite; pedicels beyond the bracteoles 1–$1\frac{3}{4}$ in. long, slender. *Buds* ovoid, blunt, $\frac{2}{3}$ in. long. *Sepals* 6, white, tinged outside with yellow, obovate, sharply mucronate, 1–$1\frac{1}{4}$ in. long, $\frac{3}{4}$-1 in. wide, shortly pubescent externally. *Stamens* glabrous, rather longer than the styles; filaments linear, flattened, about $\frac{1}{3}$ in. long, nearly thrice as long as the pale yellow anthers. *Achenes* numerous, wide-ovoid, compressed, glabrous, narrowed at the tip into the densely villous style.

Tab. 8702.—Fig. 1 and 2, stamens; 3, carpel; 4, young achene:—*all enlarged.*

M.S.del. J.N.Fitch lith.

Vincent Brooks Day & Son Lt^d imp.

Tab. 8703.

MESEMBRYANTHEMUM Pillansii.

South Africa.

Ficoideae. Tribe Mesembryeae.

Mesembryanthemum, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. i. p. 854.

Mesembryanthemum Pillansii, *Kensit in De Wild. Pl. Nov. Hort. Then.* vol. ii. p. 3, t. 57; species *M. lacero*, Haw., affinis sed petalis longe spathulatis in genere insignis.

Suffrutex ramosus, 45–60 cm. altus, omnino glaber, ramis ancipitibus rubescentibus. *Folia* 3–3·5 cm. longa, 6–9 mm. lata, 8–10 mm. crassa, patula, incurva, acute triquetra, carina saepe eroso-dentata vel interdum integra, apice mucronato-acuta, glauco-viridia. *Flores* solitarii, terminales. *Pedicelli* 1–1·3 cm. longi. *Calyx* 5-lobus, glauco-virens; tubus late obconicus, circiter 1·3–1·5 cm. diametro; lobi inaequales, 1–1·5 cm. longi, foliiformes, tribus late membranaceo-marginatis. *Corolla* 4–4·5 cm. diametro; petala biformia, exteriora numerosa, 3-seriata, alia patula, alia erecto-incurva, 1·5 cm. longa, longe spathulata, unguibus filiformibus albis et laminis elliptico-lanceolatis obtusis 2·5–3 mm. latis pulchre purpureis; interiora numerosa, breviora, supra stamina arcte incurva, filiformia, alba. *Stamina* numerosa, supra ovarium incurva, alba. *Ovarium* latum, depressum, apice concavum, 10-loculare; stigmata 10, minuta, conniventia. —N. E. Brown.

The very distinct and somewhat peculiar *Mesembryanthemum* here figured was first met with in January, 1907, at Moutons Vley, near Piquetberg, Cape Colony, at an elevation of about 2,000 feet above sea-level. It has since been introduced to European collections by its discoverer, Mr. N. S. Pillans. The species has not yet flowered at Kew, and the material from which our plate has been prepared was obtained from a plant presented by Mr. Pillans to the Cambridge Botanic Garden in 1913 which flowered there for the first time in June, 1914. Mr. R. I. Lynch, to whom we are indebted for this material, informs us that the conditions suitable for other members of the genus meet the requirements of *M. Pillansii*. The nearest ally of *M. Pillansii* is *M. lacerum*, Haw., which it much resembles in foliage, but the very remarkable spathulate petals at once distinguish our

plant not only from *M. lacerum*, but from every other known member of the genus. The stamens and the minute stigmas are completely concealed within the dome formed by the closely contiguous incurved filiform inner petals.

DESCRIPTION.—*Undershrub*, 1½–2 ft. high, much branched, glabrous in all its parts; branches forked, reddish. *Leaves* glaucous-green, sharply triquetrous, 1¼–1½ in. long, ¼–⅓ in. wide, and ⅓–⅖ in. thick, spreading, then slightly incurved, the keel often erosely toothed, occasionally entire, the tip acute and slightly mucronate. *Flowers* solitary, terminal, pedicels ⅓–½ in. long. *Calyx* 5-lobed, greenish glaucous; tube wide obconic, from ½–⅔ in. across; lobes unequal, ⅖–⅗ in. long, resembling the leaves, three with, the others without, broad membranous margins. *Corolla* 1½–1¾ in. across; petals of two kinds; the outer numerous, 3-seriate, some spreading, others erect or incurved, about ⅔ in. long, long-spathulate with a white filiform claw and a purple elliptic-lanceolate blunt blade 1/10–⅛ in. wide; the inner also numerous but shorter, white, filiform, sharply incurved over the stamens. *Stamens* numerous, white, incurved over the ovary. *Ovary* broad and depressed with a concave apex, 10-locular; stigmas 10, minute, connivent.

TAB. 8703.—Fig. 1, section of a flower; 2, an outer petal; 3, inner petals and stamens; 4, an inner petal:—*all enlarged.*

M.S.del. J.N.Fitch lith.

Vincent Brooks Day & Son Lt^d imp.

L Reeve & C^o London.

Tab. 8704.

RUBUS illecebrosus.

Japan.

Rosaceae. Tribe Rubeae.

Rubus, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. i. p. 616.

Rubus illecebrosus, *Focke, in Abhandl. Nat. Ver. Bremen*, vol. xvi. p. 278 (1899), *et in Bibl. Bot.* heft lxxii. p. 152, fig. 64; a *R. fraxinifolio*, Poir., caulibus herbaceis, petiolis pedunculisque crebrius aculeatis, inflorescentiis **paucifloris et floribus majoribus differt.**

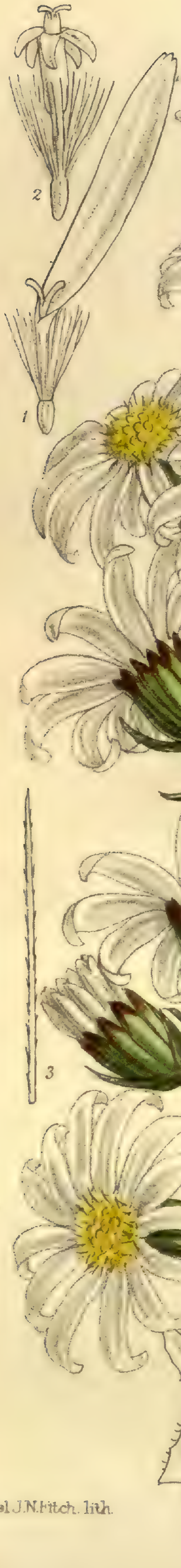
Herba perennis, 15–25 cm. alta, radix repens surculigera; caulis erectus, annuus, angulatus, glaber, aculeatus. *Folia* 8–18 cm. longa, imparipinnata, summo 3-foliolato excepto 5–7-juga; rhachis sulcata, aculeata; foliola anguste ovata vel ovato-lanceolata, duplicato-serrata, impresso-venosa, glabriuscula, 4–7 cm. longa, 1·5–3 cm. lata; stipulae bracteaeque lineari-lanceolatae, 0·5–1 cm. longae. *Flores* terminales, pauci, spectabiles, 2·5–3·5 cm. diametro; pedunculi graciles, aculeati, glabri, 2–4 cm. longi. *Sepala* late ovata, caudato-acuminata, concava, circiter 1 cm. longa. *Petala* late obovato-orbicularia, 1–5 cm. lata; post anthesin patentia. *Stamina* numerosa, filamenta glabra. *Carpella* numerosissima, glabra; styli filiformes, glabri. *Fructus* ellipsoideo-globosus, 3 cm. longus, colore instar fragorum, sapore vero pinguior.—*Rubus rosifolius coronarius flore simplici forma alpina*, Maxim. in Bull. Acad. Imp. Sc. St. Pétersb. vol. xiii. p. 158, et Diagn. Pl. Nov. Jap. dec. x. p. 388. *R. rosaefolius*, J. H. Wils. in Journ. Roy. Hort. Soc. Genet. pp. 207, 208, fig. 49 B; non Sm. *R. sorbifolius*, Hort. ex Focke l.c.; non Maxim. *R. rosaefolius, γ coronarius simplicifolia*, Makino in Tokyo Bot. Mag. 1901, p. 50.—Phonzo Zoufou, **vol. xxv. fol. 15, recto.—R. A. Rolfe.**

The Strawberry-Raspberry is a fruit which, during recent years, has attracted attention for its handsome appearance, though, in spite of its being sweet and palatable, it is somewhat disappointing as regards flavour. It is a *Rubus* with a herbaceous stem which in summer attains a height of eight inches, but in winter dies down to the ground. At Kew it is quite hardy, thriving well in loamy soil and in full sunshine. It may be propagated by seeds or by division of the old plants in early spring. The history of this *Rubus* is rather a confused one. There is a figure of the plant in the Phonzo Zoufou which is characteristic and unmistakable. In 1872 Mr. Maximowicz referred to the presence in

Japan of two forms of *R. rosaefolius*, Smith; one of these, termed *alpina*, has 1–2 terminal flowers on its dwarf young stems, with fruits an inch long; it was suggested that this form might be the doubtful *R. chinensis*, Ser., described in 1825. That this is not the case is shown by the comparison of our material with a fragment and with a natural-size photograph of the original specimen of *R. chinensis* kindly presented to the Kew collection by Mr. C. de Candolle; *R. chinensis* is a shrub, nearly allied to *R. rosaefolius*, which was collected in China by Sir G. L. Staunton, the type specimen of which was presented to Mr. A. P. de Candolle by Mr. A. B. Lambert. Some time later than 1872 the Strawberry-Raspberry was introduced into American gardens and grown as *R. sorbifolius*. It subsequently reached Europe under this name, as a plant of somewhat doubtful origin, though probably Japanese. In 1899 Dr. Focke proved that the plant is not *R. sorbifolius*, Maxim., and described it as a new species, *R. illecebrosus*, allied to the western Chinese *R. xanthocarpus*, Bur. & Franch., without, however, indicating its identity with Maximowicz's alpine form of *R. rosaefolius* and with the Phonzo Zoufou plant. Still later Dr. J. H. Wilson, overlooking Focke's account, referred to our plant as *R. rosaefolius*, "better known in gardens as *R. sorbifolius*, the so-called Strawberry-Raspberry." Modern Japanese authors, apparently equally unaware of the existence of the name *R. illecebrosus*, consistently treat our plant as a dwarf mountain form of *R. rosaefolius*, notwithstanding the evidence to the contrary which its herbaceous habit affords.

Description.—*Herb* 6–10 in. high; root perennial, creeping and giving off offsets; stem erect, annual, angled, glabrous, prickly. *Leaves* 3–7 in. long, imparipinnate, uppermost 3-foliolate, the others 11–15-foliolate; rachis sulcate, prickly; leaflets narrow ovate or ovate-lanceolate, doubly serrate, nearly glabrous, the veins sunk above, $1\frac{3}{4}$–3 in. long, $\frac{2}{3}$–$1\frac{1}{4}$ in. wide; stipules and bracts linear-lanceolate, $\frac{1}{5}$–$\frac{2}{3}$ in. long. *Flowers* terminal, few, showy, 1–$1\frac{1}{3}$ in. across; peduncles slender, prickly, glabrous, $\frac{3}{4}$–$1\frac{3}{4}$ in. long. *Sepals* wide ovate, caudate-acuminate, concave, about $\frac{1}{3}$ in. long. *Petals* wide obovate-orbicular, $\frac{2}{3}$ in. wide, ultimately spreading. *Stamens* numerous; filaments glabrous. *Carpels* very many, glabrous; styles filiform, glabrous. *Fruit* ellipsoid-globose, $1\frac{1}{4}$ in. long, like that of a strawberry in colour, but rather insipid when eaten.

Tab. 8704.—Fig. 1, portion of margin of a leaf; 2, a flower-bud; 3 and 4, stamens; 5, a carpel; 6, a fruiting carpel:—*all enlarged.*



2

1

3

5

4

M S del J.N.Fitch. lith.

Vincent Brooks, Day & Son Lt.d imp.

L.Reeve & Co London

Tab. 8705.

SENECIO Hectori.

New Zealand.

Compositae. Tribe Senecionideae.

Senecio, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 446.

Senecio Hectori, *Buch. in Trans. New Zeal. Inst.* vol. v. p. 348 (1873); vol. vi. t. 23; *Kirk, Students' Flora*, p. 344; *Cheeseman, Man. New Zeal. Flora*, p. 376; species foliis magnis repando-dentatis basin versus pinnatilobulatis, floribus radii albis valde distincta.

Frutex erectus, ramosus, usque ad 4 m. altus; rami robusti, patuli, puberuli, apicem versus foliati. *Folia* inferiora obovato-elliptica, apice subacuta, basin versus pinnato-lobulata, 15–25 cm. longa, 8–12 cm. lata, repando-dentata, dentibus subacute mucronatis 4–7 mm. distantibus, supra minute et sparse pustulata, infra tenuiter lanata; superiora sessilia elliptico-lanceolata vel lanceolata, fere glabra, subintegra. *Corymbi* terminales, laxe ramosi, foliosi, 30 cm. diametro vel ultra; pedunculi glanduloso-puberuli. *Capitula* 4–5 cm. expansa. *Involucrum* campanulatum, 1·5 cm. longum, medio circiter 1 cm. diametro; bracteae 12–14, subbiseriatae, basi bracteis paucis linearibus instructae, oblongo-lineares, acute acuminatae, apice intus hirsutae, extra glabrae, margine anguste cartilagineo-membranaceae. *Flores radii* albi, 12–14; corollae tubus anguste cylindricus, 5 mm. longus, glaber; lamina lanceolata, apice minute tridentata, 1–5 cm. longa; styli rami graciles, longe exserti. *Flores disci* flavi; corollae tubus inferne anguste cylindricus, 0·8 cm. longus, superne leviter ampliatus, glaber; lobi 5, oblongo-lanceolati, subacuti, 2 mm. longi; styli rami exserti, 2 mm. longi. *Achaenia* 3·5 mm. longa, glabra. *Pappus* albus, amplus, 0·8 cm. longus, barbellatus.—J. Hutchinson.

Among the thirty species of *Senecio* which are native in New Zealand one of the finest is *S. Hectori*, the subject of our plate. It is readily distinguished from its New Zealand congeners by its foliage, the basal portion or petiole of the lower leaves being pinnately lobulate, while the remainder of the leaf-blade is repand-dentate. This species is apparently confined to the South Island where it occurs in the Nelson and Westland districts, at elevations of from 250 to 3,500 feet above sea-level. It flowers there from December to February, and in favoured localities the flower-heads are at times two and a half inches across. For the intro-

duction of this fine plant horticulture is indebted to Captain A. A. Dorrien Smith, Kingshill, Berkhamsted, by whom it was brought to England in 1910, when an example was presented by him to Kew. The Kew plant has thriven well in a cool greenhouse, but has not yet flowered, and for the material from which our illustration has been prepared we are indebted to its introducer, with whom one of his own examples blossomed for the first time in July, 1913. As a conservatory plant *S. Hectori* should prove a welcome acquisition; at Kew it is unfortunately too tender for cultivation out of doors.

Description.—*Shrub*, erect, branched, reaching a height of 12–14 ft.; branches stout, spreading, pubescent, leafy towards their extremities. *Leaves*: lower obovate-elliptic, somewhat acute towards the base, pinnately lobulate where they pass into the petiole, the margin elsewhere repand-toothed, the teeth somewhat sharply mucronate, $\frac{1}{6}$–$\frac{1}{4}$ in. apart, 6–10 in. long, 3–5 in. wide, finely but sparingly pustulate above, sparsely woolly beneath; upper sessile, elliptic-lanceolate or lanceolate, almost glabrous and nearly entire. *Corymbs* terminal, loosely branched, leafy, 12 in. across or wider; peduncles glandular-puberulous. *Heads* $1\frac{3}{4}$–2 in. wide or in its native habitat sometimes $2\frac{1}{2}$ in. across; involucre campanulate, $\frac{2}{3}$ in. long, over $\frac{1}{3}$ in. wide in the middle; bracts 12–14, more or less 2-seriate, but with a few additional linear basal ones, those of the involucre proper oblong-linear, acutely acuminate, glabrous outside, hirsute at the tip within, their margin narrowly cartilaginous-membranous. *Ray-florets* 12–14, white; corolla-tube narrow cylindric, $\frac{1}{5}$ in. long, glabrous; lamina lanceolate, minutely 3-toothed at the tip, $\frac{2}{3}$ in. long; style-arms slender, far-exserted. *Disk-florets* yellow; corolla-tube narrow-cylindric below, $\frac{1}{3}$ in. long, slightly widened upwards, glabrous; lobes 5, oblong-lanceolate, somewhat acute, $\frac{1}{2\,4}$ in. long, exserted. *Achenes* $\frac{1}{7}$ in. long, glabrous. *Pappus* white, copious; setae $\frac{1}{3}$ in. long, barbellate.

Tab. 8705.—Fig. 1, ray-floret; 2, disk-floret; 3, pappus-seta; 4, anthers; 5, style-arms:—*all enlarged.*

M.S del. J.N Fitch lith

Tab. 8706.

CHIRITA Trailliana.

South-west China.

Gesneriaceae. Tribe Cyrtandreae.

Chirita, *Ham.*; *Benth. et Hook. f. Gen Plant.* vol. ii. p. 1022.

Chirita Trailliana, *Forrest et W. W. Smith in Not. R. Bot. Gard. Edin.* vol. ix. p. 95; affinis *C. brevipedi*, C. B. Clarke, et *C. speciosae*, Kurz, sed ab utraque foliis obtuse crenatis nec serratis et corolla pendula, ab illa praeterea pedunculo elongato, pedicello breviore, ab hac inflorescentiis paucifloris, calycis lobis latioribus late lanceolatis distincta.

Herba humilis, perennis; caulis repens, brevis, dense ferrugineo-hirsutus. *Folia* omnia basalia, petiolo 8–15 cm. alto rubro-hirsuto suffulta, lamina late ovata, obtusa vel subacuta, basi subaequaliter vel oblique subcordata vel cordata, 12–20 cm. longa, ad 15 cm. lata, obtuse crenata, supra densiuscule, infra laxius pilis subadpressis vel ad margines patulis vestita et hic purpurea vel purpureo-marmorata. *Pedunculi* inter folia emersi, erecti, ad 12 cm. longi, subrobusti, rubro-hirsuti, apice herbaceo-bracteati, cymam ad flores perpaucas redactam gerens floribus haud simul apertis; pedicellus ad 2 cm. longus. *Calyx* ovoideus, ultra trientem in lobos subaequales late-lanceolatos acutos divisus, paulo ultra 2 cm. longus, rubro-hirsutus. *Corolla* extra undique magis minusve pubescens; tubus 4·5 cm. longus, basi per 8 mm. late cylindricus, deinde sensim oblique ampliatus, superne ad 1·5 cm. latus, pallide violaceus, intus antice lineis flavidis notatus; limbus pulchre violaceus; lobis labii superioris rotundatis 1 cm. longis 1·5 cm. latis, iis labii inferioris 1·8 cm. longis. *Staminum* filamenta glabra, 6 mm. longa; antherae albo-lanatae. *Staminodia* filamentis albo-lanatis. *Discus* crenulatus. *Ovarium* cum stylo pubescens; stigma inaequaliter bilobum. *Capsula* linearis, ad 9 cm. longa.—O. Stapf.

The *Chirita* here figured, which was discovered by Mr. G. Forrest in May and June, 1912, at elevations of from 5,000–7,000 feet in the Shweli Valley and on the hills to the south of Tengueh in Yunnan, is one of a group of species the hitherto known members of which are *C. brevipes*, Clarke, a native of the Khasia Hills, and *C. speciosa*, Kurz, which was discovered in south-western Yunnan at Poneline by the late Dr. J. Anderson. Yet another, but as yet an undescribed species belonging to the same group has been found, also in Yunnan, at 4,500 feet elevation, near Szemao, by Dr. A. Henry. The Szemao plant has leaves that are almost exactly like

those of the Tengueh species which its discoverer and Mr. W. W. Smith have named *C. Trailliana*, but the calyx-teeth are narrowly linear above the base and the blossoms are aggregated in cymes of about four flowers, borne on peduncles as short as those of the Khasian *C. brevipes*; the flowers, however, develop very unequally and there is probably, as in *C. Trailliana*, only one open at a given time. Examples of this Szemao plant from rather higher elevations have, however, peduncles with solitary flowers, and it is not impossible that it may eventually prove to be a form of *C. Trailliana*. The plant from which our figure was prepared was obtained for the Kew collection in 1915 from Messrs. R. Wallace and Company, Colchester, by whom it had been raised from seed collected by Mr. Forrest for Mr. J. C. Williams, Caerhays Castle, Cornwall. It flowered in June in a greenhouse, and is evidently too tender to thrive out of doors in Britain. It survived at Kew after flowering, but failed to mature seeds.

Description.—*Herb*, perennial; stem short, creeping, densely rusty-hirsute. *Leaves* all radical; lamina broadly ovate, obtuse or somewhat acute, base nearly equally or obliquely rounded or cordate, margin bluntly crenate, 5–8 in. long, up to 6 in. wide, densely hirsute above, beneath rather laxly clothed with hairs, which near the purplish or purple blotched margin are spreading, but elsewhere are somewhat appressed; petiole about 3–6 in. long, hirsute with reddish hairs. Peduncles erect, from among the leaves, up to 5 in. long, rather stout, hirsute with reddish hairs, with herbaceous apical bracts and bearing a reduced few-flowered cyme, the individual flowers opening in succession and not simultaneously; pedicel $\frac{3}{4}$ in. long. *Calyx* ovoid, divided for more than one-third its length into nearly equal wide-lanceolate acute lobes, over $\frac{3}{4}$ in. long, hirsute with reddish hairs. *Corolla* more or less uniformly pubescent outside; tube nearly 2 in. long, wide cylindric for $\frac{1}{8}$ in. at the base, thereafter slightly obliquely enlarged and $\frac{5}{8}$ in. wide above, pale violet with yellow lines in front inside; limb bright violet, lobes of the upper lip rounded, $\frac{3}{8}$ in. long, $\frac{5}{8}$ in. wide, rather shorter than those of the lower lip which are $\frac{3}{4}$ in. long. *Stamens* with glabrous filaments $\frac{1}{4}$ in. long, and with white villous anthers; staminodes with white woolly filaments. *Disk* crenulate. *Ovary* and style pubescent; stigma unequally 2-lobed. *Capsule* linear, over $\frac{1}{8}$ in. long.

Tab. 8706.—Fig. 1, calyx in vertical section, with pistil; 2, a hair; 3, corolla-tube, laid open; 4 and 5, anthers; 6, transverse section of ovary; 7, sketch of an entire plant:—*all enlarged except* 7, *which is much reduced.*

Vincent Brooks Day & Son Lith.

L Reeve & C° London

Tab. 8707.

SAXIFRAGA manshuriensis.

Manchuria and Corea.

Saxifragaceae. Tribe Saxifrageae.

Saxifraga, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. i. p. 635.

Saxifraga (§ Boraphila) **manshuriensis**, *Komarov in Acta Hort. Petrop.* vol. xxii. p. 415; *Irving in Gard. Chron.* 1915, vol. lviii. p. 184, cum icon.; species *S. punctatae*, Linn., affinis, foliis majoribus, petiolis et scapo hirsutis, inflorescentia contracta, sepalis ciliatis, petalis duplo brevioribus differt.

Herba succulenta, scapigera. *Rhizoma* breve, crassiusculum. *Folia* radicalia plura, longepetiolata, rotundato-reniformia, 5–6·5 cm. longa, 7–8·25 cm. lata, grosse crenata, crenis apiculatis, supra glabra, intense viridia, margine minute ciliolata, infra sparsissime pilosula, pallida; petioli 10–14 cm. longi, hirsuti, rubelli. *Scapus* solitarius, circiter 35 cm. longus, pilis glanduloso-capitatis densiuscule hirsutus. *Panicula* terminalis, subglobosa, valde contracta, circiter 4 cm. diametro; bracteae lineares, inferiores ad 2 cm. longae, acutae, rubellae; pedicelli dense glanduloso-pilosi. *Flores* saepe 6–8-meri. *Sepala* reflexa, oblongo-lanceolata, obtusiuscula, circiter 2·5 mm. longa, ciliata. *Petala* spatulato-oblonga, leviter retusa, 3·5 mm. longa. *Stamina* petalis duplo plura; filamenta clavata; antherae breviter oblongae. *Pistilla* rubra, fere ad basin libera, staminibus breviora, ampulliformia.—*S. punctata*, Linn., var. *manchuriensis*, Engl. Monogr. Saxifrag. p. 139.—M. L. Green.

The Saxifrage which forms the subject of our illustration was first described, as a variety of *S. punctata*, Linn., in 1872 by Engler. The plant on which the original account was based had been collected by Wilford on the coast of Manchuria in 1857. The Linnean species with which Engler thus associated Wilford's plant has a wide range in northern Asia, arctic America and the Rocky Mountains; so far, however, as is yet known, Wilford's Saxifrage appears to be confined to Manchuria and northern Corea, where according to Komarov, who in 1904 first indicated the desirability of regarding it as a distinct species, it is to be found in shady damp places on stream-banks. From *S. punctata* *S. manshuriensis* differs in being a more robust plant with larger and thicker leaves, in having the petioles and scapes hirsute, and in having the inflorescence globose and contracted. The plant from

which our figure has been prepared was raised at Kew from seed obtained from Messrs. Regel and Kesselring, Petrograd, in 1913. The majority of the plants thus raised flowered for the first time in 1915. In the Rock Garden at Kew *S. manshuriensis* is in flower from July to August. It has proved a hardy perennial, easy to cultivate, which flourishes well in moist shady spots.

DESCRIPTION.—Herb, fleshy, scapigerous, with a short, stout rootstock. *Leaves* several radical, long-petioled; lamina rounded-reniform, 2–2½ in. long, 2¾–3½ in. across, coarsely crenate, the teeth apiculate, dark green and glabrous above, paler and sparingly finely pilose beneath, the margin very shortly ciliolate; petiole 4–5½ in. long, hirsute, reddish. *Scape* solitary, about 14 in. long, rather densely hirsute with gland-tipped hairs. *Panicle* terminal, much congested, subglobose, about 1½ in. across; bracts linear, the lowest about ¾ in. long, acute, reddish; pedicels densely glandular-pilose. *Flowers* usually 6–8-merous. *Sepals* reflexed, oblong lanceolate, somewhat obtuse, about $\frac{1}{10}$ in. long, ciliate. *Petals* spathulate-oblong, slightly retuse, ⅐ in. long. *Stamens* twice as many as the petals; filaments clavate, anthers shortly oblong. *Pistils* red, free nearly to the base, shorter than the stamens, flask-shaped.

TAB. 8707.—Fig. 1, portion of under surface of leaf; 2, flower-bud; 3, open flower; 4, calyx and pistil; 5 and 6, stamens; 7, sketch of an entire plant:—*all enlarged except* 7, *which is much reduced.*

M.S. del. J.N. Fitch lith.

Vincent Brooks, Day & Son Lith. imp

L. Reeve & Co. London.

CORYLOPSIS Willmottiae.

Western China.

Hamamelidaceae.

Corylopsis, *Sieb. et Zucc.*; *Benth. et Hook. f. Gen. Plant.* vol. i. p. 667.

Corylopsis Willmottiae, *Rehd. et Wils. in Plant. Wils.* vol. i. p. 425 (1913); *Bean, Trees & Shrubs*, vol. i. p. 399; species *C. Veitchianae*, Bean, valde affinis sed calyce fructuque glabris, nectariis brevioribus, antheris luteis inclusis facile distinguenda.

Frutex 2–4 m. altus; ramuli novelli graciles, glabri, anno sequente minute lenticellati; gemmae hiemales pallide virentes, lucidae, stipitatae. *Folia* decidua, obovata vel ovata vel ovalia, 2·5–8·5 cm. longa, 1·2–3·7 cm. lata, acuta vel breviuscule acuminata, basi rotundata vel cordata, margine minute remoteque denticulata, supra saturate viridia, glabra, subtus glauca primum sericea demum fere glabra, nervi laterales utrinsecus 7–10; petiolus 1·2–2·2 cm. longus, primum saepe sparse pilosus, demum glaber; stipulae ovato-lanceolatae, 1·2–2·5 cm. longae, purpurascentes, extra glabrae, intus sericeae, cito caducae. *Flores* odorati in spicas pendulas, 5–7·5 cm. longas, circiter 20-floras congesti; rhachis pilosa; bracteae stipulares concavae, 9 mm. longae, extra glabrae, intus sericeae; bracteae florales breviores utrinque pilosae. *Calyx* glaber, 5-lobus, basi breve turbinatus; lobi rotundati, 2 mm. longi. *Petala* suborbicularia, breviter unguiculata, dilute lutea, 3–3·5 mm. lata. *Stamina* 5, petalis breviora; filamenta glabra, versus basin dilatata; antherae intense luteae; nectaria 5, alte 2-fida, lobis calycis breviora. *Styli* 2, glabri; stigmata recurva. *Capsula* subglobosa, glabra, 2-locularis, 6 mm. longa. *Semina* anguste-ovoidea, nigra, nitida, hilo albo notata.—*C. multiflora*, Hort. Willmott; non Hance.—W. J. Bean.

The genus *Corylopsis* has its chief centre in China, whence it extends to the Eastern Himalaya on the one hand, to Japan on the other. The various species are charming in gardens for their early blossoming, their soft yellow flowers and their gracious perfume. The species which forms the subject of our illustration, *C. Willmottiae*, has all these qualities; it grows freely, and so far it has, since it reached this country, given no sign of being at all tender. Like other members of the genus, however, it is liable to suffer, when in flower, from late spring frosts which mar its beauty though they do not affect its growth. The introduction of *C. Willmottiae* horticulture owes to Mr. E. H. Wilson, by whom it was first dis-

covered in 1908, south-west of Tachien-lu in Western Szechuan, growing at altitudes of 6,000 to 7,500 feet. Two years later Wilson collected seeds again in the same locality, and from these seeds of 1910 most of the plants now in cultivation were raised. The plant which has provided the material for our plant was purchased for Kew from Messrs. J. Veitch and Sons in 1913, and flowered there in April, 1914. The species had, however, blossomed two years previously in the garden of Miss E. A. Willmott at Warley Place, and was exhibited by her at a meeting of the Royal Horticultural Society in March, 1912, as *C. multiflora*, Hance, another Chinese species. It ripened seeds at Kew in 1916. *C. Willmottiae* is more closely allied to *C. Veitchiana*, Bean, figured at t. 8349 of this work, than it is to *C. multiflora*, but from our plant *C. Veitchiana* may be readily distinguished by its pilose calyx and fruits, by its longer nectaries and by its exserted red anthers.

DESCRIPTION.— *Shrub*, 6–12 ft. high; young branches slender, glabrous, minutely lenticellate the second year; winter-buds pale shining green, stalked. *Leaves* deciduous, obovate, ovate or oval, 1–3½ in. long, ½–2½ in. wide, rounded or cordate at the base, acute or short acuminate, shallowly and widely denticulate; deep green and glabrous above, glaucous and at first silkily pilose beneath, ultimately nearly or quite glabrous; veins seven to ten on each side the midrib; petiole ½–⅞ in. long, glabrous, or at first slightly pilose; stipules ovate-lanceolate, ¼–1 in. long, purplish, glabrous outside, silky within, soon falling. *Spikes* 2–3 in. long, pendulous, carrying about twenty fragrant flowers; main axis pilose; stipular bracts concave, ⅔ in. long, glabrous outside, silky-pilose within; floral bracts smaller, pilose on both sides. *Calyx* glabrous, 5-lobed, the base shortly turbinate, the lobes rounded, $\frac{1}{12}$ in. long. *Petals* roundish, with a short claw, soft yellow, $\frac{1}{8}$–$\frac{3}{16}$ in. wide. *Stamens* 5, shorter than the petals, filaments glabrous, dilated towards the base; anthers dark yellow; nectaries 5, deeply bifid, shorter than the calyx-lobes. *Styles* 2, glabrous; stigmas recurved. *Capsules* 2-celled, subglobose, ¼ in. long, glabrous. *Seeds* narrow-ovoid, black and shiny; hilum white.

TAB. 8708.—Fig. 1, bract; 2, flower; 3 flower, calyx-lobes and petals removed; 4, stamens and nectaries; 5, stamen; 6, pistil :—*all enlarged.*

M.S. del. J.N. Fitch lith.

Vincent Brooks, Day & Son Lith. imp.

L. Reeve & Co. London.

Tab. 8709.

VANDA LUZONICA.

Philippine Islands.

ORCHIDACEAE. Tribe VANDEAE.

VANDA, *R. Br.*; *Benth. et Hook. f. Gen. Plant.* vol. iii. p. 578.

Vanda luzonica, *Loher ex Rolfe in Orch. Rev.* 1915, p. 137, fig. 12, et p. 371; species *V. tricolori*, Lindl., affinis, caule breviore, floribus minoribus, sepalis albis nec regulariter brunneo-maculatis distinguenda.

Herba epiphytica, 25–30 cm. alta. *Caules* crassi, erecti, vaginis foliorum obtecti. *Folia* recurva, oblonga, brevissime biloba, coriacea, basi conduplicata, 15–35 cm. longa, 2·5–7 cm. lata. *Scapi* erecti, circiter 20 cm. longi, multiflori; bracteae orbiculari-obovatae, obtusae, patentes, 0·5–1 cm. longae; pedicelli 5–7 cm. longi. *Flores* speciosi, 5·5 cm. diametro. *Sepala* et *petala* patentia, obovata, obtusa, basi attenuata, circiter 2·5 cm. longa. *Labellum* trilobum, basi saccatum, 2–2·5 cm. latum; lobus intermedius pandurato-oblongus, obtusus, convexus; lobi laterales erecti, auriculati. *Columna* lata, oblonga, circiter 4 mm. lata. *Pollinia* 2; stipes oblongus; glandula late squamata. *Capsula* oblonga, acute angulata, 6–7 cm. longa, longe pedicellata.—R. A. ROLFE.

The distinct and handsome *Vanda* here figured is a native of the Philippines. It was collected in central Luzon, in the Montalban district, by Mr. A. Loher in May, 1905, and dried specimens from this locality, accompanied by a photograph and drawings, were presented by him to the herbarium at Kew in 1906 under the name *V. luzonica*. That living plants had already been introduced to cultivation in Europe is shown by a reference to the fact that the species, under this name, was then alive in the orchid collection at Erlangen. The plant from which our figure has been prepared was purchased for the orchid collection at Kew in 1911 from Mr. C. F. Karthaus, Potsdam. But although the name *V. luzonica* was already in use among orchid growers, no description of the species was published until 1915, when a plant flowered in the collection of Mr. H. Dixon, Sydney, New South Wales. A little later in the same year it was exhibited in flower at the Panama Exhibition. In November, 1915, it also flowered in the collection of Messrs. Sander and Sons, St. Albans,

and in December, 1915, the Kew plant, too, flowered for the first time in a tropical house where it had been grown and had thriven well under the conditions suitable for *V. tricolor*, Lindl., a species from Java, figured at t. 4432 of this work, which is its nearest ally in the genus. Though so closely related the two species differ very markedly in coloration, the sepals and petals of *V. luzonica* being white, not yellow, with a tinge or, at times, a defined spot of purple towards the apex, but with no trace of the brown blotches which characterise the sepals and petals of *V. tricolor*.

Description.—*Herb*, epiphytic, 10–12 in. high; stem stout, erect, clothed with leafy sheaths. *Leaves* recurved, oblong, shortly 2-lobed, coriaceous, conduplicate at the base, 6–14 in. long, 1–1$\frac{1}{5}$ in. wide. *Scapes* erect, about 8 in. long, many-flowered; bracts orbicular-ovate, obtuse, spreading, $\frac{1}{5}$–$\frac{2}{5}$ in. long; pedicels 2–2$\frac{3}{4}$ in. long. *Flowers* showy, over 2 in. wide. *Sepals* and *petals* spreading, obovate, obtuse, narrowed to the base, about 1 in. long. *Lip* 3-lobed, base saccate, $\frac{3}{4}$–1 in. long, nearly $\frac{2}{3}$ in. wide; mid-lobe pandurate-oblong, obtuse, convex; lateral lobes erect, auriculate. *Column* broad, oblong, about $\frac{1}{6}$ in. wide. *Pollinia* 2; stipe oblong; gland scale-like, broad. *Capsule* oblong, acutely angular, 2$\frac{1}{4}$–3 in. long, long-pedicelled.

Tab. 8709.—Fig. 1, lip and column; 2, column and base of lip; 3 and 4, pollinarium, seen from in front and from behind; 5, sketch of an entire plant: —*all enlarged except* 5, *which is much reduced.*

A

B

5

4

3

8

7

6

2

1

M.S del J.N Fitch. lith.

Vincent Brooks, Day & Son Lt.d imp

L. Reeve & Co. London.

Tab. 8710 A.

PYROLA ULIGINOSA.

North America.

ERICACEAE. Tribe PYROLEAE.

PYROLA, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 602.

Pyrola uliginosa, *Torr. & A. Gray ex Torr. Fl. New York*, vol. i. p. 453, t. 69; *Britton & Brown, Ill. Fl. N. United States*, vol. ii. p. 551, fig. 2729; ed. 2, vol. ii. p. 669, fig. 3200; *Andres in Ber. Deutsch. Bot. Ges.* vol. xxx. p. 569, fig. I 4 et II 2, 3; *Rydberg in N. Amer. Flora*, vol. xxix. p. 23; species *P. rotundifoliae*, Linn., affinis, foliis tenuioribus haud nitidis, floribus paulum minoribus rubro-purpureis et calyce breviore distinguenda.

Herba perennis, caudice longo repente ramoso. *Caulis* brevissimus. *Folia* suborbicularia vel ovato-elliptica, apice rotundata vel raro subacuta, basi leviter cuneata et interdum inaequalia, minute crenulata, ad 7 cm. longa et 6 cm. lata, tenuia, glaberrima, supra atro-viridia, haud nitida, infra pallidiora, interdum rubescentia; petiolus ad 10 cm. longus, acute 3-angulatus. *Scapus* erectus, 1·5–3 cm. longus, glaber, striato-angulatus, squamis 1–3 lanceolatis membranaceis 1·2–1·5 cm. longis instructus. *Racemus* 6–10 cm. longus, laxe 5–20-florus; bracteae lanceolatae, membranaceae, roseolae, pedicellis subaequilongae; pedicelli graciles, 4–7 mm. longi. *Flores* nutantes, fragrantes. *Calycis* lobi ovato-triangulares vel ovato-lanceolati, 2·5–3 mm. longi, basin versus 2 mm. lati, acuti. *Corolla* extra praesertim vivide rubro-purpurea vel rosea, intus saepe pallide rosea, circiter 1·1 cm. lata. *Petala* obovata vel elliptica, plus minusve concava, apice rotundata, 6–8 mm. longa, 6–7 mm. lata. *Stamina* 10, conferta, adscendentia; antherae purpureae vel roseae, loculis basi breviter mucronatis. *Ovarium* depresso-globosum, 5-lobum, glabrum; stylus declinatus, 7–8 mm. longus, apicem versus annulatus, stigmate 5-lobulato. *Fructus* depresso-globosus, circiter 8 mm. diametro.—*P. rotundifolia*, Linn., var. *uliginosa*, A. Gray, Man. Bot. ed. 2, p. 259, et Syn. Fl. N. Amer. vol. ii. pt. 1, ed. 2, p. 48. *P. rotundifolia* var. *incarnata*, A. Gray, ll.cc. p. 259 and p. 47, non var. *incarnata*, DC. *P. incarnata*, Piper in Contrib. U.S. Nat. Herb. vol. xi. p. 435, non Fisch. *P. elata*, Nutt. in Trans. Amer. Phil. Soc. N.S. vol. viii. p. 270. *P. asarifolia*, Michx. var. *incarnata*, Fernald in Rhodora, vol. vi. p. 178. *Thelaia asarifolia*, Alefeld in Linnaea, vol. xxviii. p. 54, partim. *T. bracteosa*, Alefeld, l.c. p. 57, partim.—S. A. SKAN.

This interesting and pretty plant, the Bog or Swamp Wintergreen of North America, was originally described from material collected by Dr. Knieskern at Oriskany, Oneida County, New York, where it was found in Sphagnum swamps. It is now known to be distributed from Nova Scotia to New York, South Dakota, Colorado,

MAY, 1917.

Oregon, and from Washington to Alaska, in bogs, meadows and copses. The material figured came in June, 1916, from Mr. F. R. S. Balfour, of Dawyck, Peeblesshire, where the plant was grown from roots collected by him in the Olympic Mountains, Washington. *Pyrola uliginosa* belongs to the section *Thelaia*, characterised by having the petals smooth, not tuberculate, at the base, ascending stamens, and a declinate style dilated near the apex into a ring or collar, and contracted above into a stigma of five erect lobules. The connivent stamens are directed towards the upper petals, while the style curves sharply away from them towards the lowermost petal, which forms a kind of lip. To this section belongs the well-known *P. rotundifolia*, Linn., distinguished from *P. uliginosa* by its more coriaceous shining leaves, larger white flowers and much longer calyx-lobes. The variety *incarnata*, DC., of *P. rotundifolia* (*P. incarnata*, Fisch.) of Eastern Asia has rose-coloured or reddish flowers, and some botanists have identified it with *P. uliginosa*, but it differs in its more coriaceous shining leaves and longer calyx-lobes. The North American *P. asarifolia*, Michx., is distinguished by its suborbicular-reniform leaves, which are usually more or less cordate at the base. The characters distinguishing *P. uliginosa* from *P. bracteata*, Hook., are mentioned in the remarks on that species, a figure of which is also given on t. 8710.

Description.—*Herb*, perennial, with a long creeping rootstock; stem very short. *Leaves* nearly orbicular or ovate-elliptic, apex rounded rarely somewhat acute, base slightly cuneate and at times unequal, finely crenulate, up to 3 in. long, 2½ in. wide, thin, quite glabrous, dark green but not polished above, paler and sometimes reddish beneath; petiole up to 4 in. long, sharply 3-angled. *Scape* erect, 6–12 in. high, glabrous, ridged, with 1–3 lanceolate membranous scales ½–⅔ in. long. *Raceme* 2½–4 in. long, laxly 5–20-flowered; bracts lanceolate, membranous, flushed with rose, about as long as the slender, ⅙–¼ in. long pedicels. *Flowers* nodding, fragrant. *Calyx* 5-lobed; lobes ovate-triangular or ovate-lanceolate, ⅒–⅛ in. long, 1/12 in. wide at the base, acute at the apex. *Corolla* bright red-purple or rose-coloured, especially outside, within usually pale rose, about ¾ in. across; petals obovate or elliptic, concave, rounded at the apex, ¼–⅓ in. long, and nearly as wide. *Stamens* 10, approximated, ascending; anthers purple or rose, their cells shortly mucronate at the base. *Ovary* depressed-globose, 5-lobed, glabrous; style declinate, about ⅓ in. long, annulate at the apex; stigma 5-lobulate. *Fruit* depressed-globose, about ⅓ in. across.

Tab. 8710 A.—Fig. 1, flower, with petals removed; 2, pistil; 3, transverse section of ovary; 4, longitudinal section of ovary:—*all enlarged.*

Tab. 8710 b.

PYROLA bracteata.

North America.

Ericaceae. Tribe Pyroleae.

Pyrola, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 602.

Pyrola bracteata, *Hook. Fl. Bor.-Amer.* vol. ii. p. 47; *Piper in Contrib. U.S. Nat. Herb.* vol. xi. p. 435; *Rydberg in N. Amer. Flora*, vol. xxix. p. 23; species *P. uliginosae*, Torr. & A. Gray, valde affinis, sed foliis saepissime acutis minute denticulatis, bracteis majoribus, calycis lobis lanceolatis vel triangulari-lanceolatis et petalis longioribus angustioribusque differt.

Herba perennis, caudice longo repente squamoso. *Caulis* ad 5 cm. longus. *Folia* suborbicularia, late ovata vel elliptica, apice saepissime acuta, basi subcordata, rotundata vel leviter cuneata, minute et remote denticulata, ad 8 cm. longa et 5 cm. lata, tenuia, glaberrima, supra atro-viridia, nitida, infra pallidiora, saepe rubescentia; petiolus ad 10 cm. longus, acute 3-angulatus. *Scapus* erectus, 2–3 dm. longus, glaber, striato-angulatus, squamis 1–3 late lanceolatis membranaceis acuminatis 1·5–2 cm. longis instructus. *Racemus* 6–10 cm. longus, 10–25-florus; bracteae lanceolatae vel late lanceolatae, membranaceae, acuminatae, saepe roseae, pedicellis longiores; pedicelli 5–8 mm. longi. *Calycis* lobi lanceolati vel triangulari-lanceolati, circiter 4 mm. longi, basi 1·5–2 mm. lati, acuminati. *Corolla* vivide rubro-purpurea vel rosea, 1·5–2 cm. lata. *Petala* elliptico-oblonga, apice rotundata vel subacuta, 8–10 mm. longa, circiter 5 mm. lata. *Stamina* 10, conferta, adscendentia; antherae viridescenti-luteae, loculis basi conspicue mucronatis. *Ovarium* depresso-globosum, glabrum, 5-lobum; stylus declinatus, 7–10 mm. longus, apicem versus annulatus, stigmate 5-lobulato. *Fructus* depresso-globosus, 8 mm. diametro.—*P. rotundifolia*, Linn., var. *bracteata*, A. Gray in Brewer & Wats. Bot. Calif. vol. i. p. 460, et Syn. Fl. N. Amer. vol. ii. pt. 1, ed. 2, p. 48; Parsons & Buck, Wild Flowers of Calif. p. 100. *P. bracteata*, var. *Hillii*, J. K. Henry in Torreya, vol. xiv. p. 32. *Thelaia bracteosa*, Alefeld in Linnaea, vol. xxviii. p. 57, partim.—S. A. Skan.

The Indian Lettuce or Canker Lettuce of North-west America, a figure of which accompanies our illustration of *Pyrola uliginosa*, is also an interesting and pleasing plant. The type of *P. bracteata*, all the flowers of which are in bud, was collected by Dr. Scouler on the north-west coast of North America; the precise locality has not been recorded. The area it occupies is more restricted than that occupied by *P. uliginosa*; it extends from British Columbia to Idaho and California, in open coniferous woods. The material for our illustration was

communicated by Mr. F. R. S. Balfour, of Dawyck, who lifted the roots in the valley of the Olympic Mountains whence came the plant of *P. uliginosa* figured along with *P. bracteata*. At Dawyck *P. bracteata* has been grown along with *P. uliginosa* in a Vaccinium bed in a soil of peat and leaf mould with sand admixed. The subsoil is gravel; the bed is at the base of a steep bank covered with high trees, and is in close proximity to a stream. The site is thus well shaded and the atmosphere constantly moist. There are several points which render the discrimination of *P. bracteata* from *P. uliginosa* far from difficult, notwithstanding the resemblance they bear to each other. In *P. bracteata* the leaves are usually acute and the veins end in distinct, though minute marginal teeth. The bracts in *P. bracteata* are larger, the calyx teeth are longer and of a different shape; the petals are longer and narrower, and when fully expanded give the flower a 2-lipped appearance; moreover, the anthers are yellow, not purple or rose as in *P. uliginosa*. Gray states that, at times, the leaves of *P. bracteata* are variegated with whitish bands. The two vernacular names are used, according to Parsons and Buck, in California, where a preparation possessing astringent properties is made from the plant and is used medicinally as a tonic and diuretic.

DESCRIPTION.—*Herb*, perennial, with a long creeping rootstock; stem up to 2 in. in height. *Leaves* nearly orbicular, or ovate or elliptic, apex generally acute, base subcordate, rounded or slightly cuneate, minutely and distantly but distinctly toothed, up to 3 in. long and 2 in. wide, thin, quite glabrous, dark green and shining above, paler and often reddish beneath; petiole up to 4 in. long, sharply 3-angled. *Scape* erect, 8–12 in. high, glabrous, ridged, with 1–3 wide-lanceolate, membranous, acuminate scales, $\frac{2}{3}$–$\frac{3}{4}$ in. long. *Raceme* 2$\frac{1}{4}$–4 in. long, 10–25-flowered; bracts lanceolate, or wide-lanceolate, membranous, acuminate, longer than the pedicels, often rose-coloured; pedicels $\frac{1}{5}$–$\frac{1}{3}$ in. long. *Calyx* 5-lobed; lobes lanceolate or triangular-lanceolate, acuminate, about $\frac{1}{6}$ in. long, under $\frac{1}{12}$ in. wide at the base. *Corolla* bright red-purple or rose-coloured, $\frac{2}{3}$–$\frac{3}{4}$ in. across; petals elliptic-oblong, rounded or somewhat acute, $\frac{1}{3}$–$\frac{2}{5}$ in. long, about $\frac{1}{5}$ in. wide. *Stamens* 10, aggregated, ascending; anthers greenish-yellow, their cells distinctly mucronate at the base. *Ovary* depressed-globose, glabrous, 5-lobed; style declinate, $\frac{1}{3}$–$\frac{2}{3}$ in. long, annulate near the apex; stigma 5-lobulate. *Fruit* depressed-globose, about $\frac{1}{3}$ in. across.

TAB. 8710 B.—Fig. 5, portion of margin of a leaf; 6, calyx and pistil; 7 and 8, anthers:—*all enlarged.*

M.S.del J.N.Fitch lith

Vincent Brooks, Day & Son Lt.d imp.

Tab. 8711.

PLAGIOSPERMUM sinense, forma BRACHYPODA.

Manchuria.

ROSACEAE. Tribe PRUNEAE.

PLAGIOSPERMUM, *Oliv. in Hook. Icon. Plant.* vol. xvi. t. 1526 (1886); *Engl. in Engl. & Prantl, Nat. Pflanzenf. Nachtr.*, p. 186 (1897).

Plagiospermum sinense, *Oliv.* l.c.; *A. Purpus in Mitt. Deutsch. Dendr. Gesellsch.* vol. xii. p. i. cum icon. adv. (1903); *Komarov in Act. Hort. Petrop.* vol. xxii. p. 554, t. 12 (1904); *Grignan in Rev. Hort.* 1904, p. 60; *De Wild. Icon. Hort. Then.* vol. v. p. 89, t. 182 (1905); *Vilmor. in Hort. Vilmor.* p. 21 (1906); *M[ast.] in Gard. Chron.* 1907, vol. xli. p. 65 (1907); *Mottet in Rev. Hort.* 1907, pp. 152, 417, fig. 135, 136; affinis *P. uniflorae*, Stapf (Prinsepiae uniflorae, *Batal.*), sed floribus flavis, pedicellis normaliter multo longioribus, fructibus majoribus distincta.

Frutex fere 2 m. altus, virgato-ramosus; rami duorum generum, alii elongati, stricti, spinosi, glabri, annotini cortice cinereo vel albido laevi obtecti, alii admodum abbreviati, fasciculos foliorum gerentes; spini supra ramos abbreviatos orti, patuli, recti vel vix recurvi, nunc perbreves nunc ultra 1 cm. longi. *Folia* lanceolata plerumque angustata, subacuta vel subobtusa et saepe mucronata, basi longe in petiolum attenuata, integra, 1·5–2·5 cm. longa, 4–8 mm. lata, tenuia, glaberrima, supra pallide viridia, infra glauca, venis plane obscuris; stipulae ramorum elongatorum lanceolato-subulatae, demum induratae, ramorum abbreviatorum tenuiter filiformes, 2–3 mm. longae, purpurascentes, interdum sparse glanduligerae. *Flores* cum foliis ramorum abbreviatorum dispositi, aurantiaco-flavi; pedicelli sub anthesi circiter 1–1·5 cm., vel in forma culta **brachypoda** 2·5–3 mm. longi, glabri. *Calyx* late turbinatus ad 3 mm. altus, pallidus, praeter cilia praesertim dentium herbaceorum apices induentia glaberrimus, intus disco carnosulo ad os in annulum producto vestitus. *Petala* orbicularia, subdenticulata, breviter unguiculata, 3-4 mm. diametro. *Stamina* 10, disci annulo inserta; filamenta antheras parvulas aequantes. *Ovarium* in fundo receptaculi immersum, depresso-ellipsoideo-globosum, glaberrimum; stylus lateralis vel in fructu subbasalis, e receptaculo breviter exsertus, sursum sensim crassior; stigma depresso-capitatum; ovula 2, collateralia, e placenta suprabasali oblique patentia, micropyle adaxiali carunculo minuto subtecta. *Drupa* compressa-globosa, atropurpurea, pruinosa, 8 mm. diametro; putamen sectione transversa elliptica; embryonis radicula infera.—*Prinsepia chinensis*, Hallier f. in Abh. Nat. Ver. Hamburg, vol. xviii. p. 8 (1903); Bean, Trees & Shrubs, p. 223, cum icon. (1914); Rehder in Sarg. Plant. Wilson. vol. iv. p. 345 (1915).—O. STAPF.

The Manchurian genus *Plagiospermum*, Oliv., is closely allied to the Himalayan genus *Prinsepia*, Royle; the two have by some been regarded as sections of one genus. They are, however, very distinct; in *Prinsepia* the buds

are perulate, the leaves exstipulate, the stamens indefinite with discrete anther-cells, the endocarp thin and crustaceous; in *Plagiospermum* the budscales are replaced by persistent stipules, while the stamens are 2-seriate with contiguous anther-cells, and the endocarp is thick and stony. The material for our plate was supplied by Sir F. W. Moore from a plant of *Plagiospermum sinense*, which flowered at Glasnevin in February, 1916. This plant, supplied by Mr. T. Smith, Newry, came originally from Messrs. Regel and Kesselring, Petrograd. In March, 1916, another plant flowered at Kew for the first time. This plant was presented in 1908 by Mr. P. L. de Vilmorin, who had received it from Russia. In cultivation three somewhat distinct forms of *P. sinense* are met with. One of these has large leaves with relatively large flowers on long pedicels. The other two have smaller leaves and flowers; one of the two has fairly long, the other, here figured, has comparatively short flower-stalks, whence the name *brachypoda*. All are equally hardy out of doors in this country.

Description.—*Shrub*, 6–7 ft. high, virgately branched; twigs of two kinds, the former long, strict, armed with spines, glabrous, clothed with last year's grey or whitish smooth bark, the latter rather contracted, bearing clusters of leaves; the spines springing from above the short branches spreading, straight or slightly curved, some very short, others over $\frac{1}{3}$ in. long. *Leaves* usually narrowly lanceolate, somewhat acute or obtuse, and often mucronate, base gradually narrowed to the petiole, entire, $\frac{2}{3}$–1 in. long, $\frac{1}{6}$–$\frac{1}{3}$ in. wide, thin, quite glabrous, pale green above, glaucous beneath, nerves obscure; stipules of the leaves on the longer branches lanceolate-subulate, at length indurated, of those on the shorter branches thin, filiform, purplish, sometimes sparingly glandular. *Flower* arranged among the leaves of the shorter branches, orange-yellow; pedicels in flower from $\frac{1}{3}$–$\frac{2}{3}$ in. long, or in the form *brachypoda* now figured only $\frac{1}{10}$–$\frac{1}{8}$ in. long, glabrous. *Calyx* wide-turbinate, $\frac{1}{8}$ in. deep, pale, quite glabrous save for the cilia met with on the herbaceous teeth, clothed inside by a somewhat fleshy disk with an annular opening. *Petals* orbicular, somewhat denticulate, shortly clawed, $\frac{1}{8}$–$\frac{1}{6}$ in. wide. *Stamens* 10, inserted on the disk-ring; filaments as long as the small anthers. *Ovary* immersed in the base of the receptacle, depressed ellipsoid-globose, quite glabrous; style lateral or in fruit almost basal, slightly exserted from the receptacle, gradually thickened upwards; stigma depressed capitate; ovules 2, collateral, spreading obliquely from the supra-basal placenta; micropyle almost occluded by a small adaxial caruncle. *Drupe* compressed globose, dark purple, pruinose, $\frac{1}{3}$ in. wide; stone elliptic in cross section; radicle inferior.

Tab. 8711.—Fig. 1, flower; 2, the same, in section, the petals removed; 3 and 4, anthers; 5, pistil:—*all enlarged.*

M.S. del. J.N. Fitch lith.

Vincent Brooks, Day & Son Lith.ª Imp.ª

L Reeve & Cº London

Tab. 8712.

MYRSINE AFRICANA.

Africa, India, China.

MYRSINACEAE. Tribe EUMYRSINEAE.

MYRSINE, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 642.

Myrsine africana, *Linn. Sp. Plant.* ed. 1, p. 196; *Thunb. Fl. Cap. ed. Schultes*, p. 195; *Lam. Encyc. Meth.* t. 122; *Duhamel, Traité des Arbres*, vol. ii. p. 242, t. 70; *DC. Prodr.* vol. viii. p. 93; *Dyer, Fl. Cap.* vol. iv. sect. i. p. 434; *Oliver, Fl. Trop. Afr.* vol. iii. p. 493; *Collett, Fl. Simlensis*, p. 304, fig. 94; species foliis parvis dentatis a caeteris distinctissima.

Frutex dioicus, 0·6–1 m. altus, ramis minute puberulis vel fere glabris, brunneis. *Folia* alterna, coriacea, glabra; petioli 1–2 mm. longi; lamina 0·5–2·5 cm. longa, 4–12 mm. lata, lanceolata, obovata vel elliptica, obtusa vel acuta, apiculata, basi saepe cuneata, marginibus supra medium paucidentatis, supra atro-viridia, nitida, subtus pallidiora. *Flores* unisexuales, 2–5 in fasciculos axillares dispositi; pedicelli 0·5–1·5 mm. longi, glabri. *Calyx* 5-lobus, pallide brunneus, punctatus, masculi 1 mm. longus, foeminei 0·5–0·7 mm. longus; lobi ovati vel oblongi, obtusi vel acuti, minute glanduloso-ciliati vel glabri. *Corolla* 1·5 mm. longa, campanulata, 4–5-loba, pallide brunnea, punctata; lobi floris masculi late ovati, floris feminei anguste ovati, acuti, glanduloso-ciliati. *Stamina* 4–5, floris masculi corolla duplo longiora, antheris 1·5 mm. longis violaceo-purpureis; floris feminei cum corolla aequilonga, abortiva. *Ovarium* ovoideum, in stylum attenuatum, a flore masculo absens; stigma maximum, discoideum, dentato-lobatum. *Bacca* globosa, glabra, violaceo-purpurea, nitida.—N. E. BROWN.

The species here figured has been in cultivation in English gardens for more than two centuries. It is a small evergreen of very neat appearance, and when in fruit is singularly ornamental and pleasing. It is, moreover, perfectly hardy, and the single plant in the Rock Garden at Kew has grown there without any protection for the past twenty years. It thrives in either a light loamy or peaty soil and may be readily propagated by cuttings. In spite of these recommendations it is but rarely met with in collections and has been so little regarded that no horticultural figure appears to have been published. This is probably due to the fact that the plant is strictly dioecious, and that growers who have not been

at pains to procure both sexes have not appreciated how attractive the female plant may be when in fruit. The plant is interesting as being that on which Linnaeus based the genus *Myrsine*; it is further interesting in having a geographical range much wider than is usual in the order *Myrsinaceæ*. The original introduction to this country was from the Cape of Good Hope, and samples from that region were in cultivation at Hampton Court in 1691; to Cape specimens also the species owes its name *M. africana*. Thence, however, it extends through tropical Africa to Afghanistan and Northern India. A figure based on a specimen from this region has been given in the Flora Simlensis of Sir Henry Collett. It occurs again in China whence it has been recently re-introduced; most if not all the plants in modern collections are of Chinese origin. The material from which our plate was prepared was obtained in May, 1916, from the garden at Nymans, Handcross, Sussex, which contains one of the finest and most comprehensive collections of trees and shrubs in Britain, formed by the late Mr. L. Messel, and carefully maintained by his daughter. At Nymans two plants of *M. africana* of different sexes grow close together; this has resulted in the production of berries, hitherto a very rare event in this country. This, however, is not the first occasion on which *M. africana* has fruited in England; it did so at Abbotsbury in 1893 and again in 1898, as specimens communicated to Kew in these years testify.

Description.—*Shrub*, dioecious, $2\frac{1}{2}$–$3\frac{1}{2}$ ft. high; twigs finely puberulous or nearly glabrous, brown. *Leaves* alternate, coriaceous, glabrous; petioles very short, blade $\frac{1}{5}$–1 in. long, $\frac{1}{6}$–$\frac{1}{2}$ in. wide, lanceolate, obovate or elliptic, obtuse or acute, apiculate, base usually cuneate, margin sparsely toothed towards the apex, dark green and polished above, paler beneath. *Flowers* 1-sexual, in axillary clusters of 2–5; pedicels very short, glabrous. *Calyx* 5-lobed, pale brown, dotted, male $\frac{1}{24}$ in. long, female rather smaller; lobes ovate or oblong, obtuse or acute, finely glandular-ciliate or glabrous. *Corolla* $\frac{1}{16}$ in. long, campanulate, 4–5-lobed, pale brown, dotted; lobes in the male wide ovate, in the female narrow ovate, acute, glandular-ciliate. *Stamens* 4–5, in the male twice as long as the corolla, the violet-purple anthers $\frac{1}{16}$ in. long; in the female not longer than the corolla and abortive. *Ovary* absent from the male; in the female ovoid, narrowed into the style; stigma very large, discoid, distinctly lobed. *Berry* globose, glabrous, shining, violet-purple.

Tab. 8712.—Fig. 1, leaf; 2, flower; 3, calyx in section, showing the pistil; 4, corolla, laid open:—*all enlarged*.

M.S. del J.N. Fitch. lith.

Vincent Brooks, Day & Son Lith imp

L. Reeve & Co London.

Tab. 8713.

AESCULUS turbinata.

Japan.

Hippocastanaceae.

Aesculus, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. i. p. 398 (*Sapindaceae*, subord. *Sapindeae*).

Aesculus turbinata, *Blume in Rumphia*, vol. iii. p. 195 (1887); *Shirasawa, Icon. Ess. For.* vol. i. t. 71; *Elwes & Henry in Trees of Gt. Brit. & Ireland*, vol. ii. p. 221; *Schneider in Handb. der Laubholzk.* vol. ii. p. 246; *Bean in Gard. Chron.* 1902, vol. xxxi. p. 187, fig. 58, *et in Trees & Shrubs*, vol. i. p. 174; species *A. Hippocastanum*, Linn., in memoriam reducens sed ab eo fructu obovato minore verrucis nec tamen aculeis notato et foliolis margine minute aequabiliterque dentatis apte distinguenda.

Arbor ad 30 m. alta; truncus ad 2 m. crassus; gemmae perviscidae; cortex annosus desquamatus; innovationes minute pubescentes. *Folia* decidua, palmatim 5–7-foliolata; foliola sessilia obovato-cuneata, breviter acuminata, margine minute dentata, 10–25 cm. longa, 5–15 cm. lata, foliolo centrali basalibus plus quam duplo majore; supra saturate viridia, subnitida, glabra; subtus glaucescentia ad angulos costarum brunneo-floccosa ceterum glabra; petiolus 7·5-25 cm. longus. *Paniculae* aestate ineunte florescentes terminales, erectae, anguste pyramidatae, ad 25 cm. longae, basi ubi latissimae ad 8·5 cm. latae; rhachis pedicellique minute pubescentes; flores singuli 1·5 cm. expansi. *Calyx* pubescens, campanulatus, 5-lobus; lobi rotundati, ciliati. *Petala* 4, suborbicularia, abrupte unguiculata, reflexa, supra pubescentia, margine ciliata, macula centrali primum lutea demum dilute rubicunda notata, ceterum gilva. *Stamina* ad normam 7, valde exserta; filamenta gracilia, decurva, 1·5 cm. longa, *Ovarium* styloque pubescens. *Capsula* obovoidea, 3-locularis, demum 3-valvis, 5 cm. longa, fere 5 cm. lata, verrucosa. *Semina* saturate brunnea, nitida, 2·2–3·8 cm. lata.—*A. sinensis*, Hort. ex Gard. Chron. 1889, vol. v. p. 716, fig. 116. *A. chinensis*, Hort., non Bunge. *A. japonica*, Hort.—W. J. Bean.

The Horse Chestnut here figured is a native of Japan which is less often met with in collections than its merits deserve. Where it is grown it is not infrequently confused with its Chinese congener, *Aesculus chinensis*, Bunge, and in such cases the name may be further erroneously transcribed. Even when the fact that it is not the tree described by Bunge is appreciated, the practice has obtained of terming it *A. japonica*, a name for which there is no authority. The nearest ally of *A. turbinata*,

the Japanese Horse Chestnut, is the European *A. Hippocastanum*, Linn., itself; from that familiar tree it is well distinguished by the smaller, obovate, and warted, but not spiny capsules, and by the finely and more evenly toothed edges of the leaflets. In its foliage *A. turbinata* is the noblest of all the Horse Chestnuts; young trees at Kew carry leaves which, with their stalks, are sometimes twenty-seven inches long. One merit of this Japanese species is that it flowers somewhat later than the common Horse Chestnut. For the material from which our plate has been prepared we are indebted to Lieut.-Col. Sir George Holford. The tree from which it was gathered is growing close to his residence at Westonbirt, and is about thirty feet high, with a trunk two feet nine inches in girth, and a rounded crown of branches thirty feet across. This tree and another larger one at Westonbirt we believe to be the largest of their kind in the country. They were planted, Sir George informs us, by the late Mr. R. S. Holford about thirty-four years ago. In autumn the leaves turn clear golden yellow, then brown. These trees produce seeds from which young plants have been raised.

Description.—*Tree*, at its largest 100 ft. high and 20 ft. in girth of trunk; bark of old trees scaling; winter buds very viscid; young shoots minutely pubescent. *Leaves* 5–7-foliate, deciduous; leaflets sessile, 4–15 in. long, 2–6 in. wide, the terminal leaflets more than twice the size of the basal pair; obovate-cuneate, shortly acuminate, finely serrate; deep bright green and glabrous above, glaucescent and with axil-tufts of pale brown tomentum beneath; petiole 3–16 in. long. *Panicles* terminal, erect, slenderly pyramidal, up to 10 in. long by 3½ in. wide at the base; rachis and pedicels finely pubescent. *Flowers* ⅝ in. in diameter, opening in late May. *Calyx* pubescent, campanulate, 5-lobed; the lobes rounded, ciliate. *Petals* 4, subrotund with a narrow claw, reflexed, creamy-white with central-blotches of yellow which turn pink with age; pubescent above, ciliate. *Stamens* usually 7, much exserted; filaments slender, decurved, ⅝ in. long. *Ovary* and *style* pubescent. *Fruit* an obovoid, 3-celled, leathery capsule, 2 in. in length and width, the thick 3-valved pericarp covered with brown warts. *Seeds* dark shining brown, 1–1½ in. wide.

Tab. 8713.—Fig. 1, part of a leaflet; 2, flower; 3, calyx; 4, a petal; 5 and 6, anthers; 7, pistil; 8, an abortive pistil; 9, fruit; 10, seed;—*all enlarged except* 9 *and* 10, *which are of natural size.*

M S del. J N Fitch lith

Vincent Brooks, Day & Son Lt.d imp.

L. Reeve & Co. London.

Tab. 8714.

STAUROPSIS Imthurnii.

Solomon Islands.

Orchidaceae. Tribe Vandeae.

Stauropsis, *Benth.*; *Benth. et Hook. f. Gen. Plant.* vol. iii. p. 572.

Stauropsis Imthurnii, *Rolfe*; species insignis, a speciebus adhuc notis foliis longissime arcuatis et inflorescentiis amplissimis laxe paniculatis differt.

Herba epiphytica. *Caulis* erectus, brevis, crassus, 3·5 cm. latus. *Folia* arcuata, crasso-coriacea, elongato-ligulata, acuta, 7·5–10 dm. longa, 5–7·5 cm. lata, basi in vaginis amplexicaulibus dilatatis, imbricata. *Scapus* erectus, laxe paniculatus, circiter 1 m. altus; ramuli 10–20 cm. longi, laxe multiflori; bracteae breves, patentes, late ovatae, obtusae, 2·5–3 cm. longae; pedicelli 1 cm. longi. *Flores* modiocres, subcarnosi, 3·5–4 cm. diametro. *Sepala* et *petala* patentia, subspathulato-obovata, obtusa, 1·5–2 cm. longa. *Labellum* breviter unguiculatum, carnosum, trilobum, medio saccatum, 0·5–0·7 cm. longum; lobi laterales erecti, orbiculari-oblongi, circiter 3 m. longi; lobus intermedius inflexus late oblongus, obtusus, prominenter carinatus. *Columna* lata, 0·8 cm. longa. *Pollinia* obovoideo-oblonga; stipes late oblongus; glandula squamiformis.—R. A. Rolfe.

This fine *Stauropsis* is remarkable for its exceptional size and its ample lax panicle of white flowers with violet blue markings on the lip. A native of the Solomon Islands, Kew is indebted for the plant to Sir Everard im Thurn, who met with it in 1905 when visiting that Archipelago on H.M.S. "Torch," as Governor of Fiji and High Commissioner of the Western Pacific. At Langa Langa, on the west coast of Mala (Malaita) Island, an opportunity was afforded of botanising in the bush. In a forest with many large canopy trees but little undergrowth, the plant figured was found on a fallen trunk on which grew a dense mass of other orchids with ferns and grasses; it bore the remains of a fairly recent flower-spike. On reaching Fiji it was planted on a topped tree fern under a "bush house" in the gardens of Government House. It showed no sign of a new flower-spike until May, 1908. This spike was under a foot long in August, 1909, when it began to develop more rapidly, but still showed no

tendency to branch. In March, 1910, Fiji was ravaged by a violent hurricane. The *Stauropsis* was rescued from the "bush house" by Mr. D. Yeoward, Curator of the Fiji Botanic Station, and brought intact to the ruins of Government House, where it was fastened for safety underneath a billiard table. After the storm it was reinstalled on its old tree-fern stem, and during the next seven months its spike branched to some extent, and produced two rather poor flowers. In November, 1910, it was brought from Fiji by Sir Everard, and after a journey across Canada was sent from Liverpool to Kew, where it has since thriven well in the Tropical Orchid House, coming once more into flower in September, 1916. During flowering the prolonged development of the spike described by Sir Everard as regards 1903–10 has been equally manifest, but during 1914–16 branching has been more extensive. As in 1905 the plant gave evidence of having flowered during 1904, it is possible that in *S. Imthurnii* we may have a species which flowers only at definite periods. In keeping with this suggestion is the fact that in October, 1910, an imperfect dried specimen, accompanied by a sketch of a plant of this *Stauropsis*, was received at Kew from Mr. C. M. Woodford, then British Resident at Tulagi, Solomon Islands. Mr. Woodford found his plant in August, 1910, when the flowering period appeared to be nearly over, on the north side of Ysabel Island, and has noted that he had met with the species once before, but that on the first occasion it was not in flower.

DESCRIPTION.—*Herb*, epiphytic; stem short, stout, erect, 1½ in. thick. *Leaves* arcuate, firmly coriaceous, elongate-ligulate, acute, 2½–4 ft. long, 2–3 in. wide, imbricate and dilated at the base into stem-clasping sheaths. *Scape* erect, laxly paniculately branched, about 3 ft. long; branches 4–8 in. long, loosely many-flowered; bracts short, spreading, wide ovate, obtuse, 1–1¼ in. long, pedicels over ⅓ in. long. *Flowers* medium-sized, somewhat fleshy, 1½–1¾ in. wide. *Sepals* and *petals* spreading, subspathulate-ovate, obtuse, ⅔–¾ in. long. *Lip* short-clawed, fleshy, 3-lobed, saccate in the middle, ⅕–⅓ in. long; lateral lobes erect, orbicular oblong, about ⅛ in. long; mid-lobe inflexed, wide oblong, obtuse, prominently keeled. *Column* broad, ⅓ in. long. *Pollinia* obovoid-oblong; stipe wide-oblong; gland scale-like.

TAB. 8714.—Fig. 1, lip and column; 2, part of the lip, showing the sac; 3, anther-cap; 4, pollinarium; 5, sketch of an entire plant:—*all enlarged except 5, which is much reduced.*

M.S del. J.N. Fitch. lith

Vincent Brooks, Day & Son Lt^d imp

L Reeve & C^o London.

Tab. 8715.

CAMPANULA Ephesia.

Asia Minor.

Campanulaceae. Tribe Campanuleae.

Campanula, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 561.

Campanula Ephesia, *Boiss. Fl. Orient.* vol. iii. p. 898; species pulcherrima affinis *C. tomentosae*, Vent., sed robustior, foliis floribusque duplo vel triplo majoribus et corolla late campanulata nec tubuloso-campanulata differt.

Herba perennis, ubique albo-tomentosa; caulis 30–45 cm. longus, ad 6 mm. crassus, decumbens. *Folia* radicalia 10–21 cm. longa, lyrata, segmentis lateralibus decurrentibus omnibus oblongis obtusis integris vel obtuse dentatis inferioribus minoribus, superioribus 1–2 cm. longis, 0·7–2 cm. latis ellipticisque obtuse dentatis, segmento terminali 2–6 cm. longo, 1·5–4·5 cm. lato, ovato vel elliptico-ovato obtuso, obtuse dentato vel obtuse lobato dentatoque; folia caulina superiora sessilia, 1·8–4·5 cm. longa, anguste oblonga, lanceolata vel ovato-lanceolata, acuta, dentata. *Flores* secundo-racemosi vel secundo-paniculato-racemosi; pedicelli 0·5–1·5 cm. longi. *Calyx* 5-lobus, appendicibus cum tubo aequilongis; lobi 1·5–2 cm. longi, deltoidei, acuminati. *Corolla* 4–4·5 cm. longa, 3·5–4 cm. diametro, late campanulata, lobis 1 cm. longis latissime ovatis subacutis recurvis, intus glabra, extra albo-tomentosa, coerulea. *Stamina* alba; filamenta basi latissime ovato-dilatata, ciliata. *Ovarium* breviter et late obconicum, 5-loculare; stigmata 5, revoluta, viridia.—*C. tomentosa*, Lam. Encyc. Meth. vol. i. p. 584, ex parte; non Vent.—N. E. Brown.

The handsome *Campanula* here figured is a native of the province of Aidin in Asia Minor, where it has been collected in the neighbourhood of the ruins of Ephesus and Priene. Its nearest ally appears to be *C. tomentosa*, Vent., a native of Greece. The Ephesian plant is, however, of more robust habit and has larger leaves and flowers than the Grecian one; the corolla in *C. Ephesia*, the subject of our plate, is from twice to thrice as wide as that of *C. tomentosa*, and is much less tubular in form.

The introduction of this species horticulture owes to Sir J. N. Barran, Bart., by whom a living plant was brought to England from Priene, where it had been found by him in May, 1913. This plant was kept in a pot in light soil, mainly sand, with some scraps of lime-

stone on the surface and lightly watered, in a cool house at Sawley Hall, Ripon, until the following summer, when it was transferred to an open alley roofed with glass. Under this treatment the plant throve well, and in 1915 it was possible to divide it, one of the plants so obtained being presented to Kew in February, 1916. From this example, which was grown at Kew in a pot of ordinary loam, and flowered there in a cool frame in June and July, 1916, the figure of *C. Ephesia* here given was prepared. A plant at Sawley Hall flowered synchronously with the example at Kew. While in flower the Kew plant was carefully pollinated, but failed to set any seeds; soon after flowering it died. Sir John Barran informs us that the plant which flowered at Sawley Hall did the same, but in this case a few seeds were developed and saved. There appears to be no record of any previous introduction of this species to English gardens; whether its permanent establishment can be effected seems as yet doubtful.

Description.—*Herb*, perennial, uniformly white-tomentose; stem 1–1½ ft. high, up to ¼ in. thick, decumbent. *Leaves* more or less lobulate; radical 4–8 in. long, lyrate, with oblong obtuse entire or bluntly toothed decurrent lateral segments decreasing in size downwards, the upper segments ⅓–¾ in. long, ¼–¾ in. wide, elliptic and bluntly toothed, the terminal segment ¾–2¼ in. long, ⅔–1¾ in. wide, ovate or elliptic-ovate, obtuse, bluntly toothed or bluntly lobed and toothed; upper stem leaves sessile, ¾–1¾ in. long, narrow oblong, lanceolate or ovate-lanceolate, acute, toothed. *Flowers* in secund racemes or panicles; pedicels ⅕–⅗ in. long. *Calyx* 5-lobed, its appendages as long as the tube; lobes ⅔–¾ in. long, deltoid acuminate. *Corolla* 1½–1¾ in. long, 1¼–1½ in. across, wide campanulate; lobes ⅕ in. long, wide ovate, subacute, recurved, glabrous within, white tomentose outside, deep blue. *Stamens* white; filaments with wide ovate, dilated, ciliated bases. *Ovary* shortly broadly obconic, 5-locular; stigmas 5, revolute, green.

Tab. 8715.—Fig. 1, stamen; 2, apex of style and stigmas:—*both enlarged.*

1

2

3

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5

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M.S. del. J.N. Fitch. lith.

Vincent Brooks, Day & Son Ltd imp.

L. Reeve & Co London.

Tab. 8716.

DISANTHUS cercidifolia.

Japan.

Hamamelidaceae.

Disanthus, *Maxim.*; *Benth. et Hook. f. Gen. Plant.* vol. i. p. 1005.

Disanthus cercidifolia, *Maxim. in Bull. Acad. Pétersb.* vol. x. p. 485 (1866); *Sargent in Forest Flora of Japan,* t. 15; *Mottet in Rev. Hort.* 1910, p. 362, fig. 148; *Schneider, Laubholzk.* vol. i. p. 425; *Bean, Trees & Shrubs,* vol. i. p. 499; species unica.

Frutex 2–3-metralis; rami graciles, patuli; ramuli brunnei, glabri, lenticellati. *Folia* decidua, alterna, glaberrima, late ovata vel subrotundata, acuta vel obtusa, basi cordata vel truncata, margine integra, 5-nervia, 5–10 cm. longa, 4–8 cm. lata, primum intense viridia auctumno exacto aurantiaco-kermesina; petiolus 2·5–6 cm. longus. *Flores* bini, sessiles, arcte sedentes, pedunculo communi 6 mm. longo auctumno jam adulto a ramulo annotino gemmato suffulti. *Calyx* 5-lobus; lobi ovato-oblongi, recurvi. *Petala* 5, subulata, sordide kermesino-purpurea, 6–9 mm. longa. *Stamina* 5, calycis lobis parum breviora. *Styli* 2. *Capsula* dura, demum lignosa, obovoidea, 2-locularis. *Semina* in quoque loculo plura, intense brunnea, nitida, 3 mm. longa.—W. J. Bean.

Disanthus is an interesting genus of the *Hamamelidaceae*, established in 1866 by Maximowicz on the species now figured. So far as is known at present it is monotypic. From the other genera of this natural family, *Disanthus* is well distinguished by the arrangement of the flowers, which are sessile and set, base to base, on two-flowered shortly peduncled capitula. *D. cercidifolia* is described by Sargent as being not rare in the Kisogawa valley in Central Hondo, covering steep hillsides with thickets sometimes a quarter of an acre in extent. It has been in cultivation about twenty years, but does not appear to have blossomed often. For the flowering twigs now figured we are indebted to Mr. H. W. Grigg of Cann House, near Plymouth, where, in a very extensive and admirably cultivated collection of choice trees and shrubs, a healthy plant about 6 ft. high flowered last October. The flowers are of a lurid, un-

attractive hue, and they have a faint, not pleasant odour; but the shrub, as our plate shows, has a real value for the rich autumnal tints of its foliage. At Kew it has, in this respect, proved one of the most attractive of newer shrubs. It likes a sunny spot and a light loamy or peaty soil. In the absence of seeds it can be increased by layers. The leaves depicted were drawn during the last week of October, 1916, and show the autumnal colouring.

DESCRIPTION.—*Shrub*, 6–10 ft. high, with slender, spreading branches; twigs brown, glabrous, sprinkled with pale lenticels. *Leaves* deciduous, alternate, entire, quite glabrous, broadly ovate to roundish, cordate or truncate at the base, blunt or acute at the apex, 5-nerved, 2–4 in. long, nearly to quite as wide; deep green in summer changing to a rich red suffused with orange in autumn; petiole 1–2¼ in. long. *Flowers* ¾ in. wide, sessile, two of them set back to back at the summit of a peduncle ¼ in. long and produced in October from the shoots of the preceding summer. *Calyx* 5-lobed, the lobes ovate-oblong, recurved. *Petals* 5, subulate, dull crimson-purple, ¼–⅜ in. long. *Stamens* 5, scarcely as long as the calyx-lobes. *Styles* 2. *Fruit* a 2-celled, obovoid, ultimately woody capsule ½ in. long. *Seeds* several in each cell, very dark brown, shining, ⅛ in. long.

TAB. 8716.—Fig. 1, a pair of flowers; 2, calyx in vertical section; 3 and 4, anthers; 5, disk-gland; 6, ovary:—*all enlarged*.

M.S.del J.N.Fitch.lith

Vincent Brooks, Day & Son Lt^d imp

Tab. 8717.

PINUS tuberculata.

Western North America.

Coniferae. Tribe Abietineae.

Pinus, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. iii. p. 438.

Pinus tuberculata, *Gord. in Journ. Hort. Soc. Lond.* vol. iv. p. 218 cum icon. (1849) *et Pine.* p. 211; ed. 2, p. 288; *Carrière, Trait. Conif.* ed. 2, p. 441 (1867) *pro parte*; *Parlatore in DC. Prodr.* vol. xvi. pars ii. p. 394 (1868) *pro parte*; *Engelm. in Brewer & Wats. Bot. Calif.* vol. ii. p. 128 (1880); *Ravenscroft, Pinet. Brit.* vol. i. p. 93, t. 13 et figs. 1–13 (1884); *Masters in Gard. Chron.* 1885, vol. xxiv. p. 786, figs. 183, 184; *Kent in Veitch Man. Conif.* p. 386 (1900); *Sargent in Bot. Gaz.* vol. xliv. p. 226 (1907); *Beissner, Handb. Nadelholzk.* p. 270; ed. 2, p. 381 (1909); *Clinton-Baker, Ill. Conif.* (1910), vol. i. p. 57 cum icon. (1909); *Elwes & Henry in Trees of Great Brit. & Irel.* vol. v. p. 1077 (1910); *Jepson, Silv. Calif.* p. 102, t. 28, figs. 3, 4 (1910); *Bean, Trees & Shrubs,* vol. ii. p. 193 (1914): *non D. Don*; species *P. radiatae* D. Don, affinis sed habitu et conis magis elongatis glomeratis et trunco appressis e squamarum umbone breviter crasse spinosis distincta.

Arbor plerumque 6–7 m. alta, cum trunco 30 cm. crasso, rarius 25–30 m. altitudine attingens et tunc truncus triplo crassior; rami e basi patenti-adscendentes comam late pyramidalem aetate depressam depauperatam formantes; cortex primo laevis, brunneus, aetate nigrescens et irregulariter in squamas amplas solutus. *Gemmae hibernantes* cylindricae, 2–2·5 cm. longae, 6 mm. diametro, castaneae vel purpurascentes, resinosae, squamis praeter infimas arcte adpressis lanceolatis subulato-acuminatis copiose longiuscule fimbriatis. *Folia* terna, fasciculata, fasciculis basi squamis vaginantibus hyalino-scariosis primo brunnescentibus demum fuscescentibus vel griseis circumdatis, acicularia, subpungentia, 8–18 cm. longa, 1·5 mm. lata, ad margines tenuissime serrulata, rigida, pallide vel obscure viridia, dorso convexa, facie sicca inter margines et costam sulcata. *Strobili masculi* cylindrici, circiter 1·5 cm. longi, 4 mm. diametro, castanei. *Strobili foeminei* 2–4 in fasciculos congesti, sub anthesi ovoideo- vel ellipsoideo-globosi, 1·2–1·5 cm. longi. *Carpella* rotundato-ovata, quam squamae ovuliferae jam sub anthesi multo breviora; squamulae ovuliferae late ovatae, superne incrassatae et abrupte spinuloso-acuminatae. *Coni* deflexi et saepe ramo arcte appressi, ambitu oblique elongato-ovati vel ovato-oblongi, 7·5–15 cm. longi, 5–6 cm. diametro, castanei; squamae maturae spatulato-cuneatae, arctissime contiguae, lignosae, intermediae dorsales 4·5–5 cm. longae, superne ad 1·2 cm. latae, ventrales multo minores; hypophyse rhombica transverse tenuiter carinata, umbone e basi lata crassa breviter incurvo-spinosa. *Semina* obovoidea, 6 mm. longa, nigrescentia, ala late lineari-oblonga, apice obliqua, 2–2·25 cm. longa, 6–8 mm. lata, albida vel brunnescente striis striolisque rufescentibus notata.—*P. californica*, Hartweg in Journ. Hort. Soc. London, vol. ii. p. 189

(1847): non Hook. et Arn. *P. attenuata*, Lemmon in Mining & Scientific Press, Jan. 16, 1862; in Garden & Forest, vol. v. p. 65 and in Erythea, vol. i. p. 231; Sargent, Silva N. Am. vol. xi. p. 107 (1897).—O. Stapf.

The Pine here figured is the Knob-Cone Pine of western North America which extends from the valley of the Mackenzie River in Oregon to the southern slopes of the San Bernardino Mountains in California. It occurs in somewhat isolated localities, often in fairly lofty and exposed situations, where its smaller size and inferior appearance have given rise to the alternative name of Scrub Pine. A remarkable feature of the species in all its localities is the indefinite persistence of its tightly closed cones. Jepson records a limb, five and a half feet long, secured by him in the Santa Lucia Mountains, California, bearing forty-five cones; in the Museum at Kew is preserved a portion of a branch, four feet long, from a tree grown at Bayfordbury, which carries more than forty cones. The seeds thus imprisoned by the scales retain their vitality for many years, and it has been said that cones never discharge their seeds until the tree, or a least the branch on which they are borne, dies. This is not always the case, for after some successive days of great heat cones that are four or five years old may open and allow their seeds to fall. Ordinarily however, the cones remain unopened until subjected to the heat resulting from a forest-fire, when the scales come apart and the seeds thus liberated afforest the devastated area. When first discovered by Hartweg in 1847 in the Santa Cruz Mountains, California, the Knob-Cone Pine was mistaken for that form of the Monterey Pine, *P. radiata*, D. Don, to which Don had given the name *P. tuberculata*, and when Gordon drew up his account of this tree his description included along with it the tree which Don had named *P. tuberculata*. Lemmon, who first set matters right, proposed the name *P. attentuata* for Hartweg's tree; most authors, however, have preferred to accept the transfer of the name *P. tuberculata* to the Knob-Cone Pine. The material for our plate was provided by a tree in the Pinetum at Kew, one of a pair planted by Sir J. D. Hooker some forty years ago; though quite healthy and perfectly hardy these are

now only about twenty-five feet high. From what has been said above it would appear to be necessary, if seed for propagation is to be obtained from cultivated trees, to expose the ripe cones for a short time to considerable heat.

DESCRIPTION.—*Tree*, usually 20-25 ft. high, with a trunk 1 ft. in diameter, occasionally reaching 80–100 ft. in height and with a trunk twice as thick; branches somewhat spreading to form a broadly pyramidal crown which becomes thinner and flatter with age; bark at first smooth and brown, with age blackish and peeling in broad flakes. *Winter-buds* cylindric, $\frac{3}{4}$–1 in. long, $\frac{1}{4}$ in. across, chestnut-brown or purplish, resinous; bud-scales with the exception of the lowest closely appressed, lanceolate, subulate-tipped, rather deeply and freely fimbriate. *Leaves* in clusters of threes, encircled at the base by hyaline-scarious sheathing scales which are at first brownish but ultimately tawny or grey; individual leaves acicular, almost pungent, 3–7 in. long, $\frac{1}{16}$ in. wide, with very finely serrulate edges, rigid, pale or dull green, convex on the back, furrowed when dry between the midrib and margins along the face. *Male cones* cylindric, about $\frac{2}{3}$ in. long, $\frac{1}{6}$ in. wide, chestnut-brown. *Female cones* aggregated in clusters of 2–4, in flower ovoid- or ellipsoid-globose, $\frac{1}{2}$–$\frac{2}{3}$ in. long. *Carpels* rounded-ovate, even in flower much shorter than the ovuliferous scales, which are wide ovate, thickened upwards and abruptly spinulose at the tip. *Cones* when ripe deflexed and often closely appressed to the branches, in outline obliquely elongate-ovate or ovate-oblong, 3–6 in. long, 1–$2\frac{1}{4}$ in. thick, chestnut brown; ripe scales spathulate-cuneate, very close-set, woody, the central on the outer face of the cone $1\frac{3}{4}$–2 in. long, $\frac{1}{2}$ in. wide near the top, those on the inner face of the cone much smaller; hypophysis rhombic with a fine transverse keel; umbo shortly incurved, spinescent from a broad base. *Seeds* obovoid, $\frac{1}{4}$ in. long, blackish, broadly winged; wing oblique at the apex, $\frac{3}{4}$–1 in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. wide, white or brownish, marked with thicker and finer reddish lines.

TAB. 8717.—Fig. 1, portion of a leaf; 2, young male inflorescence; 3, young male cone; 4, male flower; 5, portion of tardily dehiscent female cone; 6 and 7, seed:—*all enlarged, except* 2 *and* 6, *which are of natural size.*

M.S del J.N Fitch lith.

Vincent Brooks. Day & Son Ltd imp.

L. Reeve & Co London.

Tab. 8718.

ODONTOGLOSSUM PLATYCHEILUM.

Guatemala.

Orchidaceae. Tribe Vandeae.

Odontoglossum, *H. B. et K.*; *Benth. et Hook. f. Gen. Plant.* vol. iii. p. 561.

Odontoglossum platycheilum, *Weathers in Gard. Chron.* 1892, vol. xi. p. 587, fig. 35; *Rolfe*, l.c. vol. xii. p. 35, *et in Orch. Rev.* 1906, pp. 61, 95, 327; species distinctissima, ab *O. maxillare*, Lindl., sepalis petalisque aequalibus, labello amplissimo et rubro-maculato differt.

Herba epiphytica, rhizomate subscandente; pseudobulbi anguste ovoideo-oblongi, 5–7 cm. longi, apice monophylli, basi vaginis amplis obtecti. *Folia* ligulata, subobtusa, subcoriacea, basi attenuata, 15–28 cm. longa, 2–3 cm. lata. *Scapi* axillares, erecti, 10–14 cm. longi, pauciflori, basi vaginis paucis obtecti; bracteae ovatae, subacutae, circiter 1 cm. longae; pedicelli 3–4 cm. longi, triquetri. *Flores* speciosi, rosei, labello rubro-maculato. *Sepala* oblongo-lanceolata, acuta, dorso carinata, 2–2·5 cm. longa. *Petala* oblongo-lanceolata, acuta, 2–2·5 cm. longa. *Labellum* unguiculatum, late ovatum, obtusum, 3–3·5 cm. diametro, margine repando, basi crista biloba instructa. *Columna* clavata, 1·5 cm. longa, alis angustissimis.—*Odontoglossum* sp., Hemsl. Biol. Centr. Amer., Bot., vol. iii. p. 278.—R. A. Rolfe.

The handsome *Odontoglossum* here figured is a native of Guatemala, originally described as *O. platycheilum* from a solitary plant which had flowered in March, 1892, in the collection of Mr. R. I. Measures of Camberwell. The county of origin of that example was then unknown; all that was known regarding it was that it had been acquired along with some other orchids when the Downside collection was dispersed. More than a decade later a specimen of the same species were received at Kew in a collection of dried plants communicated by Mr. J. Donnell Smith. This specimen had been gathered by Heyde and Lux in April, 1892, at an elevation of 8,800 feet, at Chiul in the department of Quiche, Guatemala; it is now known that a fruiting specimen collected by Bernoulli in Guatemala in May, 1860, belongs to the same species. In 1905 Messrs. Sander and Sons, St. Albans, were able to make an importation of this *Odontoglossum*, which since then has flowered fre-

quently in various collections. The material for our figure has been derived from a plant purchased from Messrs. Sander, which has thriven well under the conditions suitable for *O. crispum* and has flowered annually in May. In the genus, *O. platycheilum* is very distinct and indeed somewhat aberrant; its nearest ally is *O. maxillare*, Lindl., a species figured at t. 6144 of this work.

Description.—*Herb*, epiphytic; rootstock almost scandent; pseudobulbs narrowly ovoid-oblong, 2–2¾ in. long, 1-foliate, clothed below with large sheaths. *Leaves* ligulate, rather blunt, firm, narrowed to the base, 6–11 in. long, ¾–1¼ in. wide. *Scapes* axillary, erect, 4–5½ in. long, few-flowered, with a few basal sheaths; bracts ovate, subacute, about ⅖ in. long; pedicels 1¼–1¾ in. long, 3-quetrous. *Flowers* showy, rose-coloured, the lip blotched with carmine. *Sepals* oblong-lanceolate, acute, keeled on the back, ¾–1 in. long. *Petals* oblong-lanceolate, acute, ¾–1 in. long. *Lip* clawed, wide ovate, obtuse, 1¼–1⅓ in. across, margin repand, crested at the base, crest 2-lobed. *Column* clavate, ⅓ in. long, narrowly winged.

Tab. 8718.—Fig. 1, base of the lip, showing the crests; 2, column; 3, pollinarium; 4, transverse section of ovary:—*all enlarged.*

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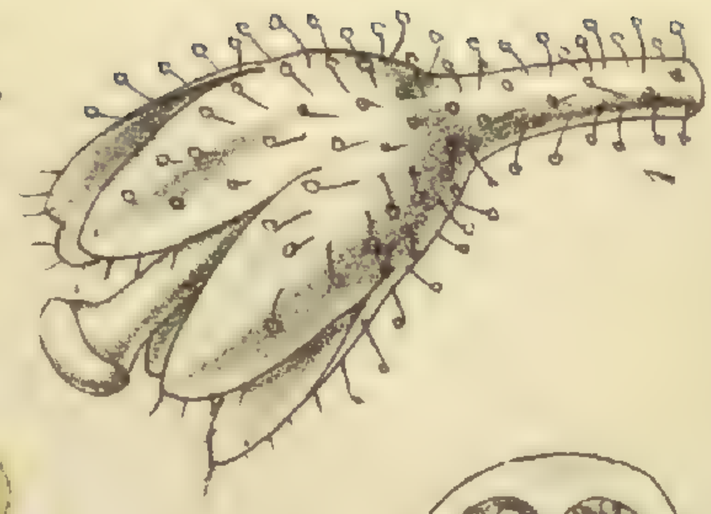

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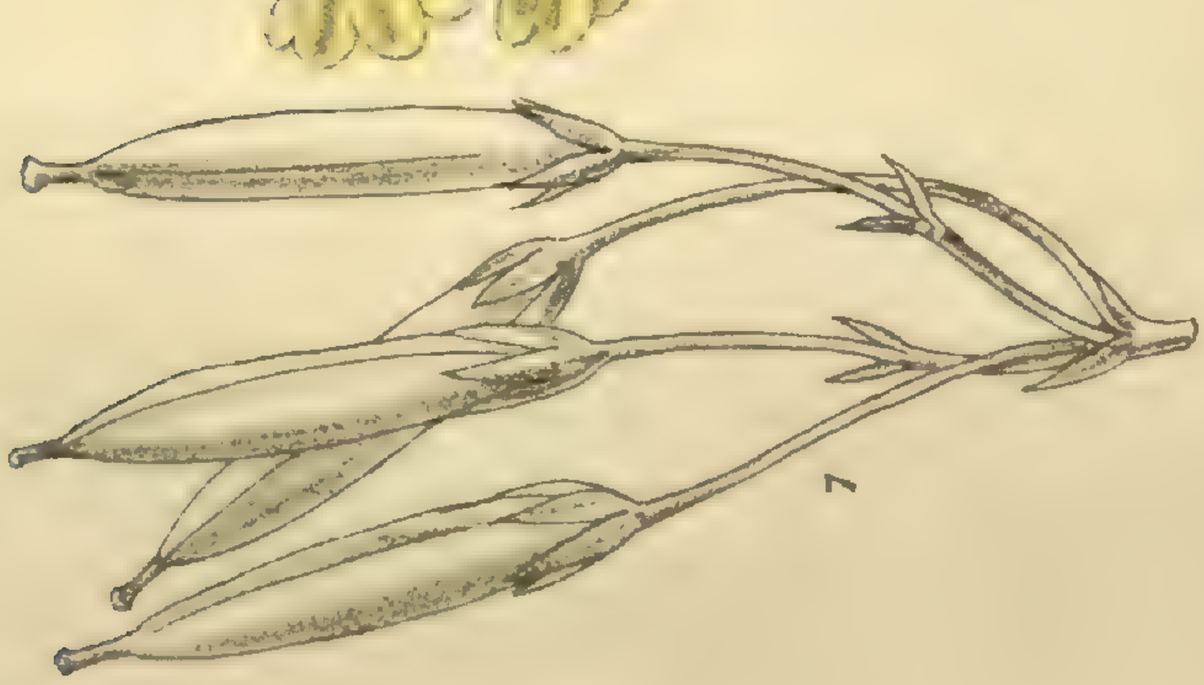

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M.S del.J.N.Fitch lith

Vincent Brooks, Day & Son Lt^d imp.

Reeve & C^o London

Tab. 8719.

OREOCHARIS Forrestii.

China.

Gesneriaceae. Tribe Cyrtandreae.

Oreocharis, *Benth.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 1021.

Oreocharis Forrestii, *Skan*; species *O. Delavayi*, Franch. affinis, sed foliis sessilibus vel brevius petiolatis, corollae tubo breviore et latiore, filamentis omnino glabris, stigmate patelliforme haud 2-lobo differt.

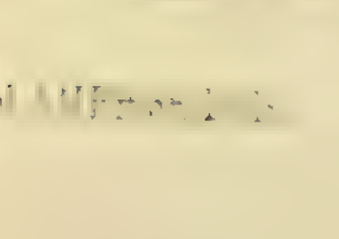
Herba perennis, acaulescens, radice fibrosa. *Folia* rosulata, exteriora petiolata, interiora sessilia, ovato-oblonga, apice obtusa, basi subcuneata, irregulariter grosse crenato-serrata, cum petiolo lato 4–14 cm. longa, 1·5–4·5 cm. lata, utrinque praesertim primum longe denseque ferrugineo-villosa; nervi primarii 5–7, crassi, subtus prominentes. *Scapi* 4–10 vel plures, erecti vel adscendentes, 6–12 cm. alti, glanduloso-pilosi, cymas laxas umbelliformes 4–7-floras gerentes; pedicelli 1–2·5 cm. longi, glanduloso-pilosi; bracteae et bracteolae anguste ovatae vel lanceolatae, 1·5–7 mm. longae. *Flores* subpenduli. *Calyx* 5-partitus, 5–8 mm. longus, parce glanduloso-pilosus; segmenta anguste ovata vel lanceolata, 4–7 mm. longa, 1·5–3 mm. lata, obtusa vel subacuta. *Corolla* pallide lutea; tubus late tubulosus, 7–10 mm. longus, 5–7 mm. latus, glanduloso-puberulus; limbus leviter 2-labiatus, saepissime 5-lobatus, rarius 4- vel 6-lobatus, erecto-patens; lobi rotundati vel subelliptici, 3–5 mm. longi, 3–4 mm. lati, superiores caeteris paulum minores. *Stamina* 4, didynama cum staminodio minuto vel minutissimo, rare 5 absque staminodio, omnia inclusa; filamenta prope basin corollae tubi inserta, leviter dilatata, 4–5 mm. longa, glabra; antherae liberae haud conniventes, ovoideo-reniformes, loculis subparallelis apice vix confluentibus. *Discus* late cupularis, 1·5 mm. altus. *Ovarium* anguste ovoideum, 3–4 mm. longum, 2 mm. latum, glabrum; stylus brevis latusque, stamina breviora vix superans, stigmate patelliforme. *Capsula* anguste fusiformis, circiter 2·5 cm. longa, 4 mm. lata.—*Roettlera Forrestii*, Diels in Notes Roy. Bot. Gard. Edinb. vol. v. p. 224; [Irving] in Gard. Chron. 1915, vol. lviii. p. 265, fig. 97 (*Rottlera*).—S. A. Skan.

This free-flowering little Gesnerad was discovered by Mr. George Forrest on the eastern flank of the Lichiang Range in North-Western Yunnan. The plant was met with on moss-covered boulders and on branches of trees in very shady situations at an elevation of from 10,000 to 11,000 feet. Mr. Forrest sent seeds to Messrs. Bees, Ltd., from whom some were received at Kew in 1913. One of the plants raised from these, which flowered in a cold house in May, 1915, furnished the material for the accompanying figure. At Edinburgh it has been in cultivation since 1909 and there it flowers freely. It is not yet clear

whether the species be hardy at Kew, but it may survive a mild winter out of doors if protected from excessive moisture. In habit it much resembles *Ramondia pyrenaica*, Rich. Though originally described as a *Roettlera*, in which some authorities merge the genera *Didymocarpus* and *Chirita*, the structure of the flower indicates its true position as a species of the closely allied genus *Oreocharis*. The salient character by which *Oreocharis* may be distinguished from *Didymocarpus*, *Chirita* and *Didissandra* is in the four fertile stamens, the anthers of which are not coherent or even connivent. Dr. Diels described *Roettlera Forrestii* as having two fertile stamens with staminodes, the number of which is not stated. What were regarded as staminodes were fertile stamens from which the anthers had fallen, the real staminode, a very small minute body, being overlooked. Through the kindness of Professor Bayley Balfour it has been possible to compare and identify the Kew plant with the excellent specimens of *Roettlera Forrestii* collected by Mr. Forrest and now preserved in the Herbarium of the Royal Botanic Garden, Edinburgh. The genus *Oreocharis* now includes about twenty species, all of which, excepting *O. notha*, C. B. Clarke, from the Philippine Islands, and *O. primuloides*, Benth. & Hook. f., from Japan, are Chinese.

DESCRIPTION.—*Herb*, perennial, stemless; root fibrous. *Leaves* rosulate, the outer stalked, the inner sessile, ovate-oblong, obtuse, base rather cuneate, coarsely irregularly crenate-serrate, including the broad petiole $1\frac{1}{2}$–$5\frac{1}{2}$ in. long. $\frac{2}{3}$–$1\frac{3}{4}$ in. wide, densely clothed especially at first with long rusty hairs, main-nerves 5–7, stout, raised beneath. *Scapes* 4–10 or more, erect or ascending, $2\frac{1}{2}$–$4\frac{3}{4}$ in. long, glandular-hairy, bearing loose umbelliform 4–7-flowered cymes; pedicels $\frac{1}{8}$–1 in. long, glandular-hairy; bracts and bracteoles narrowly ovate or lanceolate, $\frac{1}{4}$ in. long or less. *Flowers* somewhat pendulous. *Calyx* 5-partite, $\frac{1}{5}$–$\frac{1}{3}$ in. long, sparingly glandular-hairy; lobes narrow ovate or lanceolate, $\frac{1}{6}$–$\frac{1}{4}$ in. long, $\frac{1}{8}$ in. wide or narrower, obtuse or subacute. *Corolla* pale yellow; tube wide cylindric, $\frac{1}{6}$–$\frac{2}{5}$ in. long, $\frac{1}{5}$–$\frac{1}{4}$ in. wide, glandular-hairy; limb slightly 2-lipped, usually 5-lobed, rarely 4- or 6-lobed, slightly spreading; lobes rounded or somewhat elliptic, $\frac{1}{8}$–$\frac{1}{5}$ in. long, $\frac{1}{8}$–$\frac{1}{6}$ in. wide, the upper rather smaller than the others. *Stamens* 4, didynamous, rarely 5, included; staminode minute or absent; filaments inserted near base of corolla-tube, slightly dilated, $\frac{1}{6}$–$\frac{1}{5}$ in. long, glabrous; anthers free, not connivent, ovoid-reniform, cells nearly parallel, hardly confluent at the tip. *Disk* wide cup-shaped, very small. *Ovary* narrow ovoid, $\frac{1}{8}$–$\frac{1}{6}$ in. long, glabrous; style short and broad, hardly longer than the stamens; stigma patelliform. *Capsule* narrow fusiform, about 1 in. long, $\frac{1}{8}$ in. wide.

TAB. 8719.—Fig. 1, calyx and pistil; 2, corolla, laid open; 3 and 4, stamens; 5, pistil and disk; 6, transverse section of ovary; 7, fruit, drawn from the original type:—*all enlarged except* 7, *which is of natural size.*



Vincent Brooks, Day & Son Lt.d imp.

Tab. 8720.

SINOFRANCHETIA chinensis.

China.

LARDIZABALACEAE.
SINOFRANCHETIA, *Hemsl.*

Sinofranchetia chinensis, *Hemsl. in Hook. Ic. Pl.* t. 2842; species unica.

Frutex alte scandens, glaber, caule volubili laevi primo pruinoso, ramis floriferis brevibus arcte foliatis. *Folia* decidua, petiolo basin dilatatam versus canaliculato 15–16 cm. longo suffulta, 3-foliolata; foliolum intermedium obovatum, basi late cuneatum, apice breviter acuminatum, 9–12 cm. longum, 7–10 cm. latum, petiolulo 1–3 cm. longo insidens; lateralia similia nisi minora, magis minusve obliqua et basi rotundata, breviter petiolulata; omnia chartacea, supra viridia, infra pallida. *Racemi* axillares, penduli, ad 30 cm. longi, ad 6–10 cm. nudi, ebracteati; pedicelli 1–2 mm. longi. *Sepala* 6, obovata, maris 2 mm., foeminei 2·5 mm. longa. *Petala* 6, carnosa, subobcordata, 0·75 mm. longa. *Stamina* 6; maris filamenta linearia, carnosula, petala vix superantia. in urceolam conniventia; antherae supra os urceolae arcuatae, late oblongae, connectivo haud producto: foeminei effoeta, quam petala minora graciliora. *Pistilla* 3, in flore maris effoeta, minuta, in flore foemineo petala paulo superantia, elliptico- vel obovato-oblonga, ad 2 mm. longa stigmate sessili; ovula circiter 20, biseriata. *Carpella* matura baccata, ellipsoidea, ad 2 cm. longa, ad 1·5 cm. diametro, lilacina. *Semina* compressa, ambitu subelliptica, 4–5 mm. longa; testa nigricans.—Bean in Kew Bull. 1909, p. 355; Schneider, Ill. Handb. Laubholzk. vol. ii. p. 912, fig. 572; Rehder et E. H. Wils. in Sargent, Plant. Wilson. vol. i. p. 349. *Parvatia chinensis*, Franch. in Journ. Bot. vol. viii. p. 281. *Holboellia cuneata*, Oliv. in Hook. Ic. Pl. t. 1817 (fructus). *H. chinensis*, Diels in Engl. Jahrb. vol. xxix. p. 343; Réaubourg in Bull. Soc. Bot. France, vol. liii. p. 455, fig. 4 (folii anatomia). —O. STAPF.

The genus *Sinofranchetia* is a member of the *Lardizabalaceae*, a group of forms treated in the Genera Plantarum as a distinct tribe of the natural order *Berberidaceae*, but regarded in the Natürlichen Pflanzenfamilien as a distinct family. The solitary species, *S. chinensis*, is a vigorous climber with inconspicuous flowers, but with showy and striking lavender-purple fruits, which appears to be common at altitudes of 5,000–9,000 feet in western Hupeh and Szechuan. Its botanical history has been somewhat confused. In 1889 the late Professor Oliver based a new *Holboellia*, *H. cuneata*, on male and female specimens obtained by Mr. A. Henry in Hupeh, pointing out, however, certain differences, besides that of sex, in the two components of the species. The

late Mr. Franchet in 1894 described as *Parratia chinensis* a species collected by Farges in Szechuan. In this *Parratia* Professor Diels recognised the female portion of *Holboellia cuneata*, Oliv., so distinct from the male portion as to belong to a different subgenus of *Holboellia*. To this subgenus, which Diels had termed *Sinofranchetia*, the rank of a genus was accorded by Dr. Hemsley in 1909. It has now been discovered that the male portion of *Holboellia cuneata*, Oliv., is also better considered as belonging to a distinct genus, a female of which has been met with in western Hupeh by Mr. E. H. Wilson. This new genus is now known as *Sargentodoxa*, Rehder & E. H. Wilson, also a member of the *Lardizabalaceae*. The material for our figure of *Sinofranchetia chinensis* has been derived from the collection of Miss E. A. Willmott, Warley Place, by whom fruiting sprays were communicated in November, 1915, specimens with male flowers being sent in June, 1916. At Warley Place *Sinofranchetia* was raised from seed in a cold frame, and in the second year was planted against a pergola in a north-east position. A year later flowers appeared and fruit ripened. It has proved perfectly hardy and has been unscathed by the severe winter of 1916–17. It is not fastidious as regards either soil or position, it calls for no special treatment, and may be propagated by seed.

Description.—*Shrub*, wide climbing, glabrous in all its parts; stem twining, smooth, at first pruinose; flowering twigs short, closely leafy. *Leaves* deciduous, pinnately 3-foliolate, long-petioled; terminal leaflet obovate, shortly acuminate, base wide cuneate, $3\frac{1}{2}-4\frac{1}{2}$ in. long, 3–4 in. wide, petiolule $\frac{1}{2}-1\frac{1}{2}$ in. long; lateral leaflets similar but smaller, more or less oblique at the base and rounded on the outer side, shortly petiolulate; all papery, green above and paler beneath; common petiole 6–7 in. long, channelled above towards the dilated base. *Racemes* axillary, pendulous, up to 12 in. long, the naked base $2\frac{1}{4}-4$ in. long, ebracteate; pedicels very short. *Sepals* 6, obovate, those of the male $\frac{1}{12}$, of the female $\frac{1}{10}$ in. long. *Petals* 6, fleshy, somewhat obcordate, very short. *Stamens* 6, those of the male with linear, rather fleshy filaments barely longer than the petals, connivent in a cup; the anthers arched above the mouth of the cup, wide oblong; those of the female sterile, more slender, smaller than the petals. *Pistils* 3, those of the male sterile, minute: those of the female rather longer than the petals, elliptic or obovate-oblong, about $\frac{1}{12}$ in. long; stigma sessile; ovules about 20, 2-seriate. *Carpels* when ripe berry-like, ellipsoid, up to $\frac{3}{4}$ in. long, about $\frac{2}{3}$ in. wide, lilac. *Seeds* compressed, nearly elliptic in outline, $\frac{1}{6}-\frac{1}{5}$ in. long; testa blackish.

Tab. 8720.—Fig. 1, male flower; 2, vertical section of the same; 3, female flower; 4, rudimentary stamens and pistils; 5, pistil; 6, section of fruit; 7, seed:—*all enlarged except* 6, *which is of natural size.*

M.S del. J.N.Fitch lith.

Vincent Brooks, Day & Son Lt^d imp.

L.Reeve & C^o London.

Tab. 8721.

RHODODENDRON Cuffeanum.

Burma.

Ericaceae. Tribe Rhodoreae.

Rhododendron, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 599.

Rhododendron Cuffeanum, *Craib MSS.*; species *R. Dalhousiae*, Hook. f., valde affinis sed calycis lobis extra lepidotis pilis longis debilibus ciliatis differt.

Frutex laxe ramosus; caulis basi tumidus; ramuli annotini pallide cinerei, squamis peltatis sessilibus brunneis notati, vetustiores pallide brunnei, vestigiis squamarum delapsarum arcte notati. *Folia* pauca, laxa, sempervirentia, oblanceolata, apice obtusa, sensim et breviter acuminata, basi subacuto attenuata, usque ad 10 cm. longa et 3 cm. lata, coriacea, supra primum parce squamoso-glandulosa, demum glabra et conspicue reticulata, infra pallidiora, densiuscule squamoso-glandulosa, squamis brunneis inaequalibus parvis circiter 0·5 mm. distantibus; costa media supra impressa, infra prominula; nervi laterales utrinsecus 6–7, graciles, flexuosi, utrinque prominuli; petioli circiter 1·3 cm. longi, compressi, utrinque dense lepidoti. *Flores* in umbellam terminalem circiter 5-florem dispositi; pedicelli 1–1·5 cm. longi, dense lepidoti, circiter 1·5 mm. crassi, *Calyx* foliaceus, fere 1 cm. longus, inaequaliter 5-lobatus, lobis duobus inferioribus majoribus oblongis vel oblongo-rotundatis apice rotundatis pilis debilibus paucis ciliatis extra lepidotis. *Corolla* tubuloso-campanulata, 6·5 cm. longa, alba, intus dorso ochracea; tubus 3·5 cm. longus, supra basin circiter 2 cm. diametro, extra molliter pubescens; lobi 5, rotundati, basi 3 cm. lati, extra parce lepidoti. *Stamina* 10, exserta, inaequalia, longiora corollae tubo paullo breviora; filamenta basin versus molliter villoso-pubescentia; antherae brunneae, 6 mm. longae. *Ovarium* 5-loculare, fere 1 cm. longum, dense lepidotum; stylus corolla longior, basin versus parce lepidotus, stigmate capitato atro-brunneo coronatus.—J. Hutchinson.

This handsome *Rhododendron* was originally met with by Lady Wheeler Cuffe, to whom it is dedicated, on Sindaung, or "Elephant Hill," a great outlying mass, whose summit is 6,000 feet above sea-level, on the edge of the Shan plateau in Upper Burma. *R. Cuffeanum* is closely related to *R. Dalhousieae*, Hook. f., a species which extends from Sikkim through Bhutan to Manipur, but differs from that species in having its calyx-lobes lepidote outside and fringed with long weak hairs. It is more remotely allied to *R. Nuttallii*, Booth, from Bhutan, and to *R. crassum*, Franch., from Yunnan, both of which have calyx-lobes that are neither lepidote nor

fringed with hairs. Young plants of this and some other species from Sindaung were presented by Lady Wheeler Cuffe in August, 1913, to the Royal Botanic Gardens, Glasnevin. From one of these, which flowered in May, 1915, came the material on which our figure is based. Sir Frederick Moore, to whom we are also indebted for a photograph from which the sketch of the entire plant has been prepared, informs us that in some of the examples the basal swellings are much larger than in the one figured. The establishment of the plants proved slow, but after twelve months in moist heat in shade it was possible to remove them to a cool orchid house where in a deep shade they thrive well. A year later they were transferred to a cool greenhouse, with a night temperature of 45° F., and with ample ventilation. Here they have flowered and by their behaviour afford hope that they may even be hardy out of doors in the milder parts of the United Kingdom. They have been grown in ordinary heavy peat, and when once they are well established their cultivation offers no difficulty. One of the distinguishing features of *R. Cuffeanum* is its fragrance.

DESCRIPTION.—*Shrub*, loosely branched; stem swollen at the base; new shoots pale grey, beset with brown sessile peltate scales; older pale-brown, closely marked with the traces of fallen scales. *Leaves* few, widely scattered, evergreen, oblanceolate, gradually and shortly acuminate to an obtuse tip, base somewhat gradually narrowed, up to 4 in. long, $1\frac{1}{3}$ in. wide, coriaceous, at first sparingly glandular-lepidote above, at length glabrous and distinctly reticulately nerved, below paler and densely glandular-lepidote, the scales small, brown, unequal in size and discrete; mid-rib sunk above, slightly raised beneath; lateral nerves 6–7 along each side, slender, flexuous, slightly raised on both surfaces; petiole about $\frac{1}{2}$ in. long, compressed, closely lepidote. *Flowers* in terminal umbels; umbels about 5-flowered; pedicels $\frac{1}{3}$–$\frac{2}{3}$ in. long, closely lepidote. *Calyx* leafy, about $\frac{1}{3}$ in. long, unequally 5-lobed, the two lower lobes the largest,oblong or rounded-oblong, lepidote outside and with a fringe of weak hairs. *Corolla* tubular-campanulate, $2\frac{1}{4}$ in. long, white, with a yellow blotch on the upper side within; tube $1\frac{1}{3}$ in. long, about $\frac{3}{4}$ in. wide above the base, softly pubescent outside; lobes 5, rounded, about $\frac{1}{3}$ in. wide at the base, sparingly lepidote. *Stamens* 10, exserted, unequal, the longest rather shorter than the corolla-tube; filaments softly villous near the base; anthers brown, $\frac{1}{4}$ in. long. *Ovary* 5-celled, about $\frac{1}{3}$ in. long, densely lepidote; style longer than the corolla, sparingly lepidote near the base, crowned by the dark-brown capitate stigma.

TAB. 8721.—Fig. 1, apex of leaf, seen from above; 2, calyx and pistil; 3, scales from the pistil; 4 and 5, stamens; 6, transverse section of the ovary; 7, sketch of an entire plant:—*all enlarged except* 7, *which is much reduced.*

M.S. del. J.N. Fitch lith.

Vincent Brooks, Day & Son Lt.d imp.

L. Reeve & Co. London.

Tab. 8722.

BERBERIS aggregata.

China.

Berberidaceae. Tribe Berberideae.

Berberis, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. i. p. 43.

Berberis aggregata, *C. K. Schneider in Bull. Herb. Boiss*, sér. 2, vol. viii. p. 203; *et in Sargent, Pl. Wilson.* vol. i. p. 375; paniculis valde contractis, floribus dense aggregatis distincta.

Frutex 1·2–1·6 m. altus. *Ramuli* minute puberuli, juniores angulati, sulcati, brunnei, vetustiores fusco-cinerei, subangulati. *Spinae* 3-fidae, graciles, flavo-brunneae, ad 1·3 cm. longae. *Folia* 4–15-fasciculata, obovato-oblonga vel oblanceolata, in petiolum brevissimum cuneatim angustata, apice plus minusve rotundata, breviter mucronata, 0·8–1·8 cm. longa, 3·5–7 mm. lata, subcoriacea, spinuloso-dentata, utrinque subtus manifestius anguste reticulata, subtus pallida. *Racemi* valde contracti floribus pseudo-glomeratis; pedicelli 2 mm. longi, apice valde expansi; bracteae e basi ovata subulatae, pedicellis sublongiores. *Sepala* elliptica, valde concava, 3·5 mm. longa, 2·5 mm. lata. *Petala* obovata, anguste emarginata, superne fimbriata, 3·5–3·75 mm. longa, 2 mm. lata, 3-nervia, glandulis discretis elliptico-oblongis 0·6–0·7 mm. longis 0·6 mm. supra basin petalorum sitis. *Stamina* 2–2·2 mm. longa, connectivo ultra thecas 0·2 mm. producto. *Pistillum* 2 mm. longum; ovula 2. *Baccae* subglobosae, circiter 7 mm. diametro; stylus in fructu distinctus, stigmate excluso 0.5 mm. longus.—T. A. Sprague.

The very distinct *Berberis* here figured is a native of Western China. It was originally described by Dr. C. K. Schneider as *B. aggregata* from a flowering specimen collected by Potanin in Eastern Kansu with which he associated a fruiting specimen gathered by E. H. Wilson in Szechuan. It was at first placed by its author in the section *Sinenses* next to *B. Wilsonae*, Hemsl. Subsequently, however, the opportunity of studying further material obtained by Wilson in Szechuan, induced its author to transfer *B. aggregata*, on account of its inflorescence, to the section *Polyanthae*. The material for our plate has been obtained from a plant raised at Kew in 1911, from seed purchased from the Arnold Arboretum which had been collected by Mr. Wilson in October, 1910, in the Min Valley, Western Szechuan. As

August, 1917.

an addition to outdoor collections *B. aggregata* possesses the merit of being ornamental both when in flower and when in fruit, but more especially in the latter condition. It is evidently perfectly hardy, thriving well in a sunny spot planted in a loamy soil; its abundant seed renders its propagation easy.

DESCRIPTION.—*Shrub*, 4–5½ ft. high; young twigs finely puberulous, angular, sulcate, brown; older branches tawny-grey, faintly angled. *Spines* 3-fid, slender, brownish yellow, about ½ in. long. *Leaves* in clusters of 4–15, obovate-oblong or lanceolate, cuneately narrowed to a very short petiole, more or less rounded at the tip, shortly mucronate, ⅓–¾ in. long, ⅐–⅔ in. wide, somewhat coriaceous, spinulose-toothed, dark green above, pale beneath, closely reticulate on both surfaces but more distinctly beneath. *Racemes* much congested with the flowers almost glomerulate; pedicels 1/12 in. long, thickened at the tip; bracts subulate from an ovate base, rather longer than the pedicels. *Sepals* elliptic, very concave, ⅐ in. long, 1/10 in. wide. *Petals* obovate, slightly emarginate, fimbriate upwards, about ⅐ in. long, 1/12 in. wide, 3-nerved, with 2 distinct elliptic-oblong glands situated slightly above the base within. *Stamens* about 1/12 in. long, with the connective slightly produced. *Pistil* 1/13 in. long; ovules 2. *Berry* subglobose, about ⅓ in. across; style distinct.

TAB. 8722.—Fig. 1, a leaf; 2, flower; 3, a petal; 4, stamen; 5, pistil;—*all enlarged.*

3

4

5

6

2

M.S. del. J.N. Fitch. lith

Vincent Brooks, Day & Son Lt.d imp.

L. Peeve & Co. London.

Tab. 8723.

BULBOPHYLLUM lilacinum.

Malay Peninsula and Siam.

Orchidaceae. Tribe Epidendreae.

Bulbophyllum, *Thouars*; *Benth. et Hook. f. Gen. Plant.* vol. iii. p. 501.

Bulbophyllum lilacinum, *Ridl. in Journ. Linn. Soc.* vol. xxxii. p. 276, *et Mater. Fl. Malay Penins.* vol. i. p. 71; *Orch. Rev.* 1908, p. 363; affinis *B. Careyano*, Spreng., sed floribus lilacinis purpureo-maculatis longe differt.

Herba epiphytica; rhizoma repens, validulum, lignosum; pseudobulbi subapproximati, ovoidei vel interdum oblongi, 2·5–5 cm. longi, basi vaginis membranaceis obtecti, monophylli. *Folia* subpetiolata, oblonga, subobtusa, crassiuscula, 12–20 cm. longa, 2·5–4 cm. lata. *Scapi* arcuati, 15–20 cm. longi, basi vaginis spathaceis subimbricatis obtecti; racemi cylindracei, densiflori; bracteae ovato-lanceolatae, acutae vel acuminatae, 3–5 mm. longae. *Flores* mediocres, lilacini, purpureo-maculati. *Sepalum* posticum elliptico-ovatum, apice acutum et recurvum, 0·6 cm. longum; sepala lateralia connata, ovata, acuta, concava, 0·9 cm. longa. *Petala* ovata, acuminata, 2 mm. longa. *Labellum* unguiculatum, elliptico-oblongum, obtusum, crassiusculum, 3·5 mm. longum, disco tenuiter bicarinato, auriculis falcato-ovatis et subobtusis. *Columna* lata, 2 mm. longa, dentibus subulatis.—*Bulbophyllum Careyanum roseum*, Orch. Rev. 1904, p. 328.—R. A. Rolfe.

The distinct and attractive *Bulbophyllum* here figured is one that has long been in cultivation. At Kew when grown in a teak-basket under tropical conditions it is easy to manage and rarely fails to flower freely. It was long believed to be a variety of *B. Careyanum*, Spreng., and in many collections has been grown as *B. Careyanum roseum*. It was first recognised as a distinct species in 1896 by Mr. H. N. Ridley, and was originally described by him from material collected by himself on Kedah Peak in the Malay Peninsula and by Mr. C. Curtis in southern Siam. When naming it *B. lilacinum* Mr. Ridley indicated its affinity to *B. Pechei*, Bull, a native of Moulmein, figured at t. 7286 of this work. These two species differ in the colour of their flowers; both are equally closely related to *B. Careyanum*. The date of

its original introduction is uncertain. It seems to have been added to the collection of the late Sir Trevor Lawrence, Burford, Dorking, in or before 1898; in November of that year it was submitted by him to Kew for identification, with a note that it has been bought from the collection of the Hon. Walter Rothschild at Tring, but that its native habitat was unknown. This plant, which flowers regularly each autumn, was presented to the Kew collection by the late Lady Lawrence; our plate was prepared from it when in flower in November, 1915.

Description.—*Herb*, epiphytic; rootstock creeping, rather stout and woody; pseudobulbs rather close-set, ovoid or at times oblong, 1–2 in. long, clothed below with membranous sheaths, 1-foliate. *Leaves* very shortly petioled, oblong, rather blunt, fairly thick, 5–8 in. long, 1–1¾ in. wide. *Scapes* arcuate, 6–8 in. long, clothed below with membranous sheaths; racemes cylindric, dense-flowered; bracts ovate-lanceolate, acute or acuminate, ⅛–⅕ in. long. *Flowers* rather small, lilac with purple blotches. *Sepals*: posterior elliptic-ovate, tip acute and recurved, ¼ in. long; lateral connate, ovate, acute, concave, over ⅓ in. long. *Petals* ovate, acuminate, $\frac{1}{12}$ in. long. *Lip* clawed, elliptic-oblong, obtuse, rather thick, ⅐ in. long, with a finely 2-keeled disk, and with falcate-ovate rather blunt auricles. *Column* broad, $\frac{1}{12}$ in. long; teeth subulate.

Tab. 8723.—Fig. 1, flower; 2, the same, the sepals removed; 3, lip; 4, column; 5, anther-cap; 6, pollinia:—*all enlarged.*

M.S. del. J.N. Fitch lith.

Vincent Brooks, Day & Son Lt.d imp.

L. Reeve & Co. London.

Tab. 8724.

POLYGONUM Griffithii.

Northern India and Western China.

Polygonaceae. Tribe Eupolygoneae.

Polygonum, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. iii. p. 97.

Polygonum (§ Bistorta) **Griffithii**, *Hook. f. Flor. Brit. Ind.* vol. v. p. 54; species *P. sphaerostachyo*, Meisn., affinis, sed spicis saepius pluribus pedunculis brevioribus pedicellis longioribus foliisque caulinis latioribus differt.

Herba perennis, rami circiter 12 e caudice lignoso caespitose orti. *Folia* radicalia numerosa, oblonga vel elliptica, acuta, basi rotundata vel acuta, subtus fere glauca, glabra vel primum sparse hirsuta, marginibus tenuiter undulatis, venulis tenuibus sed prominentibus, 10–15 cm. longa, 3·5 cm. lata; petiolus usque ad 10 cm. longus; folia caulina pauca, radicalibus multo minora, oblonga vel ovata, 6 cm. longa, 3 cm. lata; petiolus usque ad 3 cm. longus; ochrea glabra, brunnea, 4 cm. longa. *Spicae* simplices vel ramosae, in foliorum caulinorum axillis dispositae, densiflorae; obtusae, pallide brunneae; pedicelli 7 mm. longi, tenuissimi, prope basin articulati; flores erecti. *Perianthium* turbinatum, intense kermesinum; segmenta oblonga, obtusa, saepius 3-nervia, 5 mm. longa, 2·5 mm. lata. *Stamina* 8, perianthio breviora; antherae violaceae, 1 mm. longae, obtusae. *Ovarium* anguste oblongum, 3-quetrum, 2 mm. longum; styli 3, ovario duplo longiores, laete purpurei; stigmata punctiformia parum exserta. *Achenium* 4 mm. longum, ochraceum, lignosum.—*P. calostachyum*, Diels in Notes Roy. Bot. Gard. Edinb. vol. v. p. 261. *Polygonum* sp., Griff. Itin. Notes, p. 140.—C. H. Wright.

The *Polygonum* we figure here was discovered by Dr. W. Griffith in 1837 growing on rocks above Sanah, in Bhutan, at about 10,000 feet above sea-level. The plant remained undescribed until 1886 when Sir J. D. Hooker named it *P. Griffithii*. The species was not heard of again until 1904 when it was met with by Mr. G. Forrest in moist mountain meadows on the eastern flank of the Mekong-Salween Divide in south-western Yunnan, at altitudes of 9,000–11,000 feet. It had already been gathered by Père Monbeig at Tse-kou in the same province, specimens gathered by him reaching Kew in 1905. Since then Mr. F. K. Ward has also collected this species in Yunnan. The material for our plate was provided by a plant raised from seeds received at

Kew in 1914 from Messrs. Bees, Limited, under the unpublished name *P. kermesinum* which is now current in some collections. At Kew the plants reach a height of eighteen inches and flower early in August; though quite hardy they have failed so far to mature seeds. They form a distinct addition to the Rock Garden, striking because of the numerous spikes of rich crimson flowers. *P. Griffithii* approaches most closely *P. sphaerostachyum*, Meisn., figured at t. 6847 of this work, which differs in having usually solitary smaller spikes on longer peduncles in the axils of narrower cauline leaves. While *P. sphaerostachyum* has short and often recurved pedicels, *P. Griffithii* has long erect ones. For this reason the bracts which are closely imbricate around the central axis become visible in *P. Griffithii*, and by their buff colour provide an effective contrast with the rich red of the perianth. The leaves of *P. Griffithii* are in wild specimens firm and almost leathery, in cultivated plants usually much thinner in texture.

Description.— *Herb*, perennial; branches tufted, about 12 from each woody stock. *Leaves*: radical numerous, oblong or elliptic, acute, base rounded or acute, almost glaucous beneath, glabrous or at first sparingly hairy, margins slightly undulate, nerves slender but raised, 4–6 in. long, 1½ in. wide; petiole up to 1¼ in. long; cauline few, much smaller than the radical leaves, oblong or ovate, 2¼ in. long, 1¼ in. wide; petiole up to 1¼ in. long; ochrea glabrous, brown, 1½ in. long. *Spikes* simple or branched, from the axils of the cauline leaves, dense-flowered; peduncles up to 2 in. long, very slender, jointed near the base; flowers erect. *Perianth* turbinate, deep rich crimson; segments oblong, obtuse, usually 3-nerved, $\frac{1}{5}$ in. long, $\frac{1}{10}$ in. wide. *Stamens* 8, shorter than the perianth; anthers violet, small, obtuse. *Ovary* narrow-oblong, 3-quetrous, $\frac{1}{12}$ in. long; styles 3, twice as long as the ovary, bright purple; stigmas minute, slightly exserted. *Achene* $\frac{1}{6}$ in. long, hard.

Tab. 8724.—Fig. 1, a flower; 2, perianth-tube, laid open; 3 and 4, stamens; 5, pistil:—*all enlarged.*

M S del J N Fitch lith

Vincent Brooks, Day & Son Ltd imp

J. Reeve & Co London

Tab. 8725.

ODONTOGLOSSUM chiriquense.

Central America.

Orchidaceae. Tribe Vandeae.

Odontoglossum, *H. B. et K.*; *Benth. et Hook. f. Gen. Plant.* vol. iii. p. 561.

Odontoglossom chiriquense, *Reichb. f. in Bot. Zeit.* 1852, p. 692; *Rolfe in Orch. Rev.* 1899, p. 49, fig. 8; 1902, p. 281, fig. 29; 1916, p. 177, fig. 34; species *O. coronario*, Lindl., affinis sed floribus majoribus sepalis petalisque valde undulatis apte distinguenda.

Herba epiphytica, subscandens. *Rhizoma* validum, lignosum, vaginis submembranaceis imbricatis obtectum, radices crebrius emittens; pseudobulbi ovoideo-oblongi, subcompressi, 7–11 cm. longi, 4–6 cm. lati, purpureo-suffusi, apice monophylli, basi diphylli. *Folia* elliptico-oblonga, obtusa, coriacea, basi conduplicata, 16–30 cm. longa, 6–9 cm. lata. *Scapi* erecti, validi, 30–35 cm. alti; racemi 20–25 cm. longi, multiflori; bracteae oblongo-lanceolatae, acutae, subconcavae, 1–1·5 cm. longae. *Flores* speciosi, lutei, insigniter brunneo-maculati. *Sepala* et *petala* patentia, orbiculari-elliptica, obtusa, undulata, 2·5–3 cm. longa. *Labellum* basi columnae breviter adnatum, trilobum, 2–2·5 cm. longum; lobi laterales erecti, oblique auriculati, obtusi, undulati, parvi; lobus intermedius patens vel reflexus, cuneato-obovatus, obtusus, 1·5–2 cm. longus, basi angustatus; crista tuberculata, 2-seriata, clavata, incurva, lata, 1·5 cm. longa; alae latae, membranaceae, undulatae; clinandrium cucullatum, membranaceum, cum alis continuum; pollinia 2, pyriformia; stipes planus, late oblongus; glandula squamiformis.—*O. coronarium*, var. *chiriquense*, Veitch, Man. Orch. pars. i. p. 23.—R. A. Rolfe.

This handsome *Odontoglossum* was originally discovered by Warscewicz on the volcano of Chiriqui in Costa Rica, at 9,000 feet above sea-level; it was first described by Reichenbach, from herbarium specimens, in 1852. Its introduction to cultivation did not take place until thirty years later when it was imported by Messrs. Sander and Sons, St. Albans. The locality was not then recorded, nor was it known in July, 1890, when an inflorescence was sent to Kew for determination by Messrs. E. Vervaet and Company, Ghent. In 1894 Mr. R. Pfau sent a photograph and a dried specimen from San Jose, Costa Rica. It now appears that the species also occurs in Colombia; there is, in the collection

of the late Consul F. C. Lehmann, a dried flower stated to be from Yarumal, in the province of Antioquia. The material for our figure of *O. chiriquense* has been derived from a plant acquired for the Kew collection at the Red Cross sale held in 1916. Until then this plant had been for upwards of twenty years in the collection of Mr. W. G. Grove, Holehird, Windermere. At Kew it flowered in October. It thrives well in a house suitable for species of *Miltonia*, the *Odontoglossum* house being too cold in winter for this species. It makes vigorous growth in a compost of peat fibre and sphagnum and requires a liberal supply of water. The nearest ally of *O. chiriquense* is *O. coronarium*, Lindl., figured at t. 7687 of this work, of which it has been regarded as a variety, but from which it is readily distinguished by its larger and very undulate flowers.

Description.—*Herb*, epiphytic, almost scandent. *Rootstock* stout, woody, clothed with imbricate almost membranous sheaths, giving off numerous roots; pseudobulbs ovoid-oblong, somewhat compressed, 3–4½ in. long, 1¾–2¼ in. wide, flushed with purple, 1-foliate at the top, 2-foliate at the base. *Leaves* elliptic-oblong, obtuse, leathery, conduplicate at the base, 6¼–12 in. long, 2½–3½ in. wide. *Scapes* erect, stout, 12–14 in. high; racemes many-flowered, 8–10 in. long; bracts oblong-lanceolate, acute, rather concave, ⅓–⅔ in. long. *Flowers* showy, yellow, very conspicuously blotched with brown. *Sepals* and *petals* spreading, orbicular-elliptic, obtuse, with undulate margins, 1–1⅕ in. long. *Lip* shortly adnate to the base of the column, 3-lobed, ¾–1 in. long; lateral lobes erect, obliquely auriculate, obtuse, undulate, small, mid-lobe spreading or reflexed, cuneate-obovate, obtuse, ⅔–¾ in. long, narrowed at the base; crest tuberculate, 2-seriate, clavate, incurved, broad, ⅔ in. long; wings broad, membranous, undulate; clinandrium cucullate, membranous, continuous with the wings; pollinia 2, pyriform; stipe flat, wide oblong; gland scale-like.

Tab. 8725.—Fig. 1, portion of margin of a petal; 2, column and base of lip; 3, anther-cap; 4, pollinarium; 5, sketch of an entire plant:—*all enlarged except* 5, *which is much reduced.*

M.S. del. J.N. Fitch lith.

Vincent Brooks, Day & Son Lith.

L. Reeve & Co. London.

Tab. 8726.

ORESITROPHE rupifraga.

North China.

Saxifragaceae. Tribe Saxifrageae.

Oresitrophe, *Bunge*; *Benth. et Hook. f. Gen Plant.* vol. i. p. 639.

Oresitrophe rupifraga, *Bunge, Enum. Pl. Chin. Bor.* p. 31; *Walp. Rep.* vol. v. p. 823; *Hance in Journ. Bot.* 1875, p. 132; *Hemsl. in Journ. Linn. Soc. Bot.* vol. xxiii. p. 271; *Gard. Chron.* 1917, vol. lxi. p. 155, fig. 54; species unica.

Herba acaulis, decidua; rhizoma crassum, squamosum, e rupibus dissilientibus enatum. *Folia* radicalia 2 vel 3, petiolata, late cordata, abrupte et breviter acuminata, acute duplicato-serrata, supra glabra, subtus villosa, 4–8 cm. longa, 3·5–7 cm. lata; petioli 3–12 cm. longi. *Scapi* erecti, 12–17 cm. longi, glanduloso-villosuli, apice compacte vel interdum laxe cymosim paniculati, multiflori; bracteae obsoletae; pedicelli 3–5 mm. longi. *Calyx* campanulatus, 4–5 mm. longus, 5–7-lobus; lobi elliptico-oblongi, obtusi, albi vel pallide rosei. *Petala* 0. *Stamina* 10–14, loborum calycinorum opposita; filamenta gracilia, lobis calycinis aequilonga; antherae cordato-ovatae. *Styli* 2, truncati, glabri, stigmatibus simplicibus. *Capsula* 2-rostris, 1-locularis, 2-valvis, valvis basi introflexis connatis placentiferis. *Semina* numerosa.—R. A. Rolfe.

The genus *Oresitrophe* includes only one species, *O. rupifraga*, which was first described by Dr. Bunge in 1834 from material collected by himself in clefts of rocks on the mountains near Lun-zuan-ssi and Ssi-jui-ssi in Northern China. It was regarded by him as nearly allied to *Astilbe*, Ham., though in habit very different from that genus. In the family *Saxifragaceae* it is certainly somewhat anomalous, though in floral structure it agrees best with *Chrysosplenium*, Linn.; in habit, however, it is as remote from this genus as it is from *Astilbe*. Subsequent to its discovery by Bunge, it was again collected on Mount Poa-hua-shan, near Pekin, by Dr. Bretschneider; still later it was collected on the western hills near Pekin by Mr. W. Hancock, who has noted it as confined to rocky gullies, and as being rare. More recently it has been met with again by Mr. F. N. Meyer, in crevices of rocks in the Nankow Pass, Chihli,

in northern China, to whom its introduction to horticulture is due. Struck by its suitability as a rockery plant, Mr. Meyer sent rootstocks to Kew, as those of a species of *Saxifraga*, in 1913. Since their arrival these plants have been kept in pots in a cold frame. They have thriven satisfactorily and flowered freely both in 1915 and 1916, when our drawing was prepared. Though it has not yet been planted out, *O. rupifraga* promises to be quite hardy at Kew. The leaves, in autumn, turn brown-purple.

DESCRIPTION.—*Herb*, stemless; rootstock thick, scaly, growing in clefts of rocks. *Leaves* 2–3, radical, petioled, wide cordate, abruptly shortly acuminate, sharply double-serrate, glabrous above, villous beneath, 1½–3 in. long, 1¼–2¾ in. wide; petiole 1¼–5 in. long. *Scape* erect, 5–7 in. long, glandular hairy, compactly or at times laxly cymose-paniculate; bracts obsolete; pedicels ⅛–⅕ in. long. *Calyx* campanulate, ⅙–⅕ in. long, 5–7-lobed; lobes elliptic-oblong, obtuse, white or pale rose. *Petals* 0. *Stamens* 10–14, in pairs opposite the calyx-lobes; filaments slender, as long as the calyx-lobes; anthers cordate-ovate. *Styles* 2, truncate, glabrous; stigmas simple. *Capsule* 1-locular, 2-beaked, 2-valved; valves inflexed and united at the ovule-bearing base. *Seeds* very many.

TAB. 8726.—Fig. 1, part of inflorescence; 2 and 3, stamens; 4, ovary with base of calyx-tube; 5, section of ovary:—*all enlarged*.

Vincent Brooks, Day & Son Lith.

L Reeve & Co London

Tab. 8727.

RHODODENDRON neriiflorum.

Yunnan.

Ericaceae. Tribe Rhodoreae.

Rhododendron, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 599.

Rhododendron neriiflorum, *Franch. in Bull. Soc. Bot. Fr.* vol. xxxiii. p. 230 (1886); inter species chinenses foliis glabris infra glaucis, calyce magno coccineo, corolla coccinea 5-lobata, filamentis glabris, ovario et stylo basin versus tomentello valde distincta.

Frutex laxe ramosus, usque ad 1·5 m. altus; ramuli purpurascentes, glabri, subteretes, annotini circiter 0·8 cm. crassi. *Folia* laxe disposita, longe petiolata, oblonga, apice rotundata et obtuse apiculata, basi obtusissima vel interdum breviter attenuata, 7–10 cm. longa, 2·5–4 cm. lata, rigide coriacea, supra laete viridia, infra glauco-viridia, glabra; costa media supra leviter impressa, infra prominens, basi circiter 2·5 mm. lata et semiteres; nervi laterales utrinsecus circiter 12, tenues, marginem versus evanidi et flexuosi, venis delicate reticulatis infra subconspicuis; petiolus rubro-purpureus, 1·5–2 cm. longus, primum minute purpuraceo-puberulus, mox glaber. *Flores* in capitulum subracemosum terminale circiter 8-florum dispositi; perulae exteriores obovatae, cuspidato-acuminatae, furfuraceo-puberulae, interiores oblongae ad lineares, sericeo-tomentosae; pedicelli circiter 1·3 cm. longi, breviter tomentosi. *Calyx* usque ad 1 cm. longus, inaequaliter lobatus, extra glaber, lobis purpureis breviter ciliatis. *Corolla* coccineo-purpurea, tubulosa, 5-lobata; tubus glaber, basi saccatus et intra maculis purpureis ornatus, apicem versus paullo ampliatus, 2–2·5 cm. longus, apice circiter 2 cm. diametro; lobi 5, profunde emarginati, ambitu rotundati, circiter 1·5 cm. longi. *Stamina* 10, corolla paullo breviora; filamenta complanata, glabra; antherae atro-purpureae, 3 mm. longae. *Ovarium* 5–6-loculare, flavo-tomentosum, conicum; stylus corolla aequilongus, basin versus tomentellus. *Fructus* haud visus.—J. Hutchinson.

The charming *Rhododendron* here figured appears to be confined to the Tali range in Yunnan where it was originally discovered by the Abbé Delavay a generation ago. It has been repeatedly met with on the same range by Mr. G. Forrest, at altitudes of 9,000–11,000 feet. Plants have been raised by Mr. J. C. Williams, Caerhays Castle, Gorran, Cornwall, from seed collected by Mr. Forrest, and from one of these came the material for our plate. Mr. Williams informs us that *R. neriiflorum*, which has now been in his collection some six years,

grows both well at Caerhays and at Werrington, near Launceston, which is colder than Caerhays. It is a dwarf shrub which begins to flower when less than eighteen inches in height; even in the wild state it does not exceed five feet in height. According to Forrest the flowers vary in shade from deep rose to crimson scarlet and as grown in this country it provides brilliant patches of colour. It has proved easy to grow and has the advantage of thriving well in more open spaces than the Indian species whose flowers are of the same rich colour. *R. neriiflorum* belongs to a group of species in the section *Eurhododendron* characterised by their smooth eglandular leaves. Among these it is readily distinguished by the pinkish glaucous, finely reticulate under surface of the leaves, the crimson calyx, and the glabrous filaments. It does not appear to be closely related to any other Chinese species, and is only remotely allied to the Sikkim *R. Thomsoni*, Hook. f., figured at t. 4997 of this work. In *R. Thomsoni* the corolla is of the same colour, and the under surface of the leaves has the same glaucous bloom, but the leaves in the Sikkim plant are cordate at the base and more orbicular in outline, while the ovary is quite smooth, not hairy as in *R. neriiflorum*.

Description.—*Shrub*, loosely branched, up to 5 ft. high; twigs purplish, glabrous, nearly cylindric, about $\frac{1}{3}$ in. thick in their second season. *Leaves* scattered, long stalked, oblong, rounded and bluntly apiculate at the tip, base truncate or occasionally shortly cuneate, 3–4 in. long, 1–1$\frac{3}{4}$ in. wide, firmly coriaceous, bright-green above, glaucous-green beneath, glabrous; midrib slightly sunk above, raised beneath and then near the base rounded and about $\frac{1}{10}$ in. wide; lateral nerves about 12 on each side of the midrib, slender, flexuous, becoming indistinct near the leaf margin; reticulation fine and rather visible beneath; petiole red-purple, $\frac{2}{3}$–$\frac{3}{4}$ in. long, at first finely scurfy-puberulous, soon glabrous. *Flowers* in a nearly terminal, rather racemose, usually 8-flowered truss; outer bud-scales obovate, cuspidately acuminate, scurfy-puberulous; inner oblong to linear, silky tomentose; pedicels about $\frac{1}{2}$ in. long, shortly tomentose. *Calyx* up to $\frac{2}{5}$ in. long, glabrous outside, unequally lobed; lobes purple, shortly ciliate. *Corolla* pinkish-purple, tubular, 5-lobed; tube glabrous, saccate at the base and there with a ring of purple patches, $\frac{3}{4}$–1 in. long, about $\frac{3}{4}$ in. across at the top; lobes 5, deeply emarginate, rounded, about $\frac{3}{5}$ in. long. *Stamens* 10, rather shorter than the corolla; filaments flattened, glabrous; anthers deep-purple, $\frac{1}{8}$ in. long. *Ovary* 5–6-celled, yellow tomentose, conical; style about as long as the corolla, finely tomentose towards the base. *Fruit* unknown.

Tab. 8727.—Fig. 1, tip of leaf; 2, calyx and ovary; 3, corolla, laid open; 4, part of base of corolla-tube; 5 and 6, stamens; 7, stigma; 8, transverse section of ovary:—*all enlarged*.

M S del J N Fitch 1th

Vincent Brooks, Day & Son Lith.

L Reeve & Co London.

Tab. 8728.

ASTER fuscescens.

Western China.

Compositae. Tribe Asteroideae.

Aster, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 271.

Aster fuscescens, *Bur. et Franch. in Journ. de Bot.* vol. v. p. 49 (1891); affinis *A. scabro*, Thunb., sed foliis latioribus petiolis inferioribus exalatis, involucri bracteis lineari-lanceolatis acute acuminatis dorso glanduloso-puberulis differt.

Herba; caulis simplex, usque ad 6 dm. altus, robustus, medio circiter 6 mm. crassus, sulcatus, pilis crispatis pubescens. *Folia* inferiora longe petiolata, late ovata, basi rotundata vel truncata, brevissime cuneato-producta, apice rotundata, circiter 12 cm. longa et 10 cm. lata, tenuiter chartacea, repando-dentata, dentibus conspicue mucronatis, utrinque praecipue in nervis parce pubescentia; nervi laterales utrinsecus circiter 4, marginem versus ramosi, infra prominentes; folia superiora breviter petiolata vel interdum subsessilia, late ovata ad ovato-lanceolata, subacuta, denticulata; petioli inferiores usque ad 16 cm. longi, haud alati, pilis minutis reflexis pubescentes. *Corymbi* subglobosi, multicapitulati, circiter 12 cm. diametro, ramulis glandulosо-hirsutis, bracteis parvis subfoliaceis. *Capitula* circiter 3 cm. diametro, involucri bracteae circiter 3-seriatae, usque ad 8 mm. longae, lineari-lanceolatae, acute acuminatae, dorso glanduloso-puberulae, marginibus anguste membranaceis. *Flores radii* circiter 15, a basi patulo leviter incurvati, violacei; corollae tubus 1 mm. longus, glaber; limbus linearis, apice 3-denticulatus, circiter 1 cm. longus. *Flores* disci numerosi, ochracei; corollae tubus subcylindricus, 5 mm. longus, glaber, breviter 5-lobus. *Pappus* fuscus, 6 mm. longus, minute barbellatus. *Achaenia* anguste obovoidea, leviter compressa, parce pubescentes.—J. Hutchinson.

Aster fuscescens is a species originally discovered in 1889 by the late Abbé Delavay, in the Tsang-chang mountains, Yunnan. It was met with again in 1890 near Ta-chien-lu, in Szechuan, by Prince Henri d'Orléans and Mr. Bonvalot, and was first described from their specimens. The species bears considerable resemblance to the well-known *A. scaber*, Thunb., which also occurs in Yunnan and Szechuan, but extends thence northwards as far as Corea and Japan. From that species *A. fuscescens* differs in its more rounded leaves, its less winged petiole, and particularly in the linear-lanceolate, acutely acuminate, glandular-puberulous bracts of the involucre; the flower-

heads of *A. fuscescens* are moreover distinctly larger than these of *A. scaber*. The plant figured was grown from seed presented to Kew in 1914 by Messrs. Bees. These seeds had been collected in western China by Mr. F. K. Ward. A hardy perennial which grows vigorously and ripens its seeds freely in a herbaceous border, *A. fuscescens* is well worth cultivating. At Kew it reaches a height of about two feet.

DESCRIPTION.—*Herb*; stem simple, up to 2 ft. in height, stout, $\frac{1}{4}$ in. thick, ridged, pubescent with crisp rather reflexed hairs. *Leaves* near base of stem long petioled, wide ovate, rounded at the tip, rounded or truncate and shortly cuneate at the base, about 5 in. long, 4 in. wide, thinly papery, repand-toothed, teeth distinctly mucronate, sparsely pubescent on both surfaces, but especially on the nerves; lateral nerves about 4 along each side of the midrib, branching towards the leaf-margin, raised on the under surface; upper leaves shortly petioled or sometimes nearly sessile, wide ovate to ovate-lanceolate, subacute, denticulate; lower petioles up to $6\frac{1}{2}$ in. long, not winged, finely pubescent with short reflexed hairs. *Corymbs* somewhat globose, many-flowered, about 6 in. across; twigs glandular-hairy, bracts small, rather leafy. *Heads* about $1\frac{1}{4}$ in. across; bracts of the involucre about 3-seriate, up to $\frac{1}{3}$ in. long, linear-lanceolate, acutely acuminate, glandular-pubescent on the back, the margins narrow, membranous. *Ray-florets* about 15, slightly incurved from the spreading base, violet; corolla-tube $\frac{1}{24}$ in. long, glabrous; limb linear, minutely 3-toothed at the tip, over $\frac{1}{3}$ in. long. *Disk-florets* many, yellowish; corolla-tube almost cylindric, $\frac{1}{5}$ in. long, glabrous, shortly 5-lobed. *Pappus* tawny, $\frac{1}{4}$ in. long, finely barbellate. *Achenes* narrow obovoid, slightly compressed, sparingly pubescent.

TAB. 8728.—Fig. 1, young flower-head; 2, ray-floret; 3, pappus-bristle, 4, disk-floret; 5, anthers; 6, style-arms; 7, an achene, the pappus removed;—*all enlarged*.

M.S. del. J.N. Fitch lith.

Vincent Brooks, Day & Son Lt.d imp.

L Reeve & Co London.

Tab. 8729.

PLEIONE Pricei.

Formosa.

Orchidaceae. Tribe Epidendreae.[1]

Pleione, *D. Don, Prodr. Fl. Nepal.* p. 36; *Benth. et Hook. f. Gen. Plant.* vol. iii. p. 518, sub *Coelogyne.*

Pleione Pricei, *Rolfe; Orch. Rev.* 1916, p. 126 (nomen); species nova, a *P. formosana,* Hayata, caule breviori unifloro, bracteis brevioribus et labelli disco bilamellato differt.

Herba terrestris; pseudobulbi late ovoidei vel depresso-ovoidei, olivacei, vetusti obscure angulati, 1·5–2 cm. lati, monophylli, vaginis membranaceis acutis obtecti. *Folia* per anthesin immatura, elliptico-lanceolata, acuta, 3·5–5 cm. longa, matura ad 22 cm. longa, 3·3 cm. lata. *Scapi* erecti, 6–8 cm. longi, uniflori; bracteae oblongae, subacutae, convolutae, 2–2·5 cm. longae; pedicelli 1·3–2 cm. longi. *Flores* speciosi, 11–11·5 cm. lati, lilacini, labello albidulo pallide brunneo-maculato, carinis pallide luteis. *Sepala* patentia, lanceolata, acuta vel subapiculata, 4·5–5·5 cm. longa; lateralia subrecurva. *Petala* anguste falcato-lanceolata, acuta, 5 cm. longa. *Labellum* convolutum, expansum late orbiculari-obovatum, insigniter fimbriatum, 5 cm. longum, 4 cm. latum; discus bilamellatus, lamellae undulatae, fere ad apicem extensae. *Columna* clavata, 3 cm. longa.—R. A. Rolfe.

This pleasing *Pleione* is a native of Formosa, where it was discovered by Mr. W. R. Price, during the joint expedition to that island by Mr. H. J. Elwes and himself. In 1914 pseudobulbs were sent by Mr. Price to Kew, where they produced flowers in the following spring. It was at first believed that the species might prove to be *P. formosana*, Hayata, a native of the same island first described in 1911, of which there is no specimen available for comparison. The description of *P. formosana*, however, indicates that in that species the stems are ten inches high with racemes of two to three flowers, bracts over an inch and a half in length and a 4-lamellate in place of the 2-lamellate lip-disk met with in *P. Pricei*. The figure now given has been prepared from the plants received at Kew from Mr. Price, but it has to be noted that another plant, which flowered in the collection of Mr. Elwes at Colesborne in April, 1917, produced a flower

of a rather darker rosy-lilac shade with the bract more distinctly lined with red. The species has thriven well in a tropical house under the conditions and treatment suitable for the Indian *P. Hookeriana*, which it resembles, figured at t. 6388 of this work as a *Coelogyne*.

Description.—*Herb*, terrestrial; pseudobulbs wide-ovoid or depressed-ovoid, olive-green, when old obscurely angled, $\frac{1}{3}$–$\frac{3}{4}$ in. across, 1-foliate, clothed with acute membranous sheaths. *Leaves* immature at time of flowering, elliptic-lanceolate, acute, $1\frac{1}{2}$–2 in. long, when full grown up to 9 in. long by $1\frac{1}{3}$ in. wide. *Scapes* erect, 1-flowered, $2\frac{1}{4}$–3 in. long; bracts oblong, rather acute, convolute, $\frac{3}{4}$–1 in. long; pedicels $\frac{1}{2}$–$\frac{3}{4}$ in. long. *Flowers* showy, $4\frac{1}{4}$–$4\frac{1}{2}$ in. wide, lilac or rosy-lilac, with a whitish lip which is blotched with pale brown, and is ornamented with yellow keels. *Sepals* spreading, lanceolate, acute or almost apiculate, $4\frac{3}{4}$–$5\frac{1}{4}$ in. long, the lateral pairs somewhat recurved. *Petals* narrowly falcate-lanceolate, acute, 2 in. long. *Lip* convolute, wide orbicular-obovate when spread out, markedly fimbriate, 2 in. long, $1\frac{1}{2}$ in. across; disk 2-lamellate, the keels undulate, extending nearly to the tip of the lip. *Column* clavate, $1\frac{1}{4}$ in. long.

Tab. 8729.—Fig. 1, column; 2, anther-cap; 3, pollinia:—*all enlarged.*

M.S. del. J.N. Fitch lith.

Vincent Brooks. Day & Son Lt^d imp^r

L Reeve & C^o London.

Tab. 8730.

CASTILLEJA miniata.

North America.

Scrophulariaceae. Tribe Euphrasieae.

Castilleja, *Mutis*; *Benth. et Hook. f. Gen Plant.* vol. ii. p. 973.

Castilleja miniata, *Dougl. in Hook. Fl. Bor.-Amer.* vol. ii. p. 106; *Benth. in DC. Prodr.* vol. x. p. 532; *A. Gray in Brewer & Wats. Bot. Calif.* vol. i. p. 574, *et Syn. Fl. N. Amer.* vol. ii. pars 1, ed. 2, p. 297; *Howell, Fl. Northwest Amer.* vol. i. p. 531; *Piper in Contrib. U.S. Nat. Herb.* vol. xi. p. 515; *Henshaw, Mountain Wild Flow. Amer.* p. 170; *Elwes in Gard. Chron.* 1916, vol. lx. p. 9, fig. 4; species *C. pallidae*, Kunth, var. *septentrionali*, A. Gray, simillima, sed corollae labio postico longiore praesertim differt.

Herba perennis. *Caules* e caudice sublignoso orti, adscendentes vel erecti, simplices, usque ad 5 dm. alti, 3–4 mm. crassi, parce pilosi vel inferne glabri, virides vel leviter purpurascentes, siccitate plus minusve nigro-purpurascentes. *Folia* alterna, sessilia, lanceolata vel inferiora linearia, apice angustata vel caudata, acutiuscula, integra vel apicem versus pauci-dentata, 4·5–8 cm. longa, 4–12 mm. lata, 3-nervia, puberula, interdum marginibus nervisque ciliatis. *Flores* brevissime pedicellati, in racemum vel spicam terminalem 7–10 cm. longum primum confertim demum laxius dispositi. *Bracteae* oblongo-lanceolatae, integrae vel apice incisae vel dentatae, calyces vix superantes, glanduloso-pubescentes, 3-nerviae, inferiores fere omnino virides, superiores fere omnino speciose coccineae. *Calyx* tubulosus, incurvus, 2–2·5 cm. longus, postice profunde antice paulum profundius fissus, glanduloso-pubescens, inferne pallide viridis, superne plus minusve coccineus; lobi 4, triangulari-lanceolati, 5–8 mm. longi, basi 1·25–2 mm. lati, acuti vel apiculati. *Corolla* 2·5–3·5 cm. longa; tubus tubuloso-infundibuliformis, incurvus, 1·5–2 cm. longus, pubescens, albidus; labium posticum cymbiforme, margine involutum, apice denticulatum, sat dense breviterque glanduloso-pubescens, dorso pallide viride, margine coccineum; labium anticum 1·5–2 mm. longum, 3-lobum, basi labii postici adpressum, viride. *Stamina* 4, didynama, longiora corollae subaequilonga; filamenta filiformia, glabra; antherae 2-loculares, parce pilosae. *Ovarium* ellipsoideum, apice obliquum, 4–5 mm. longum, glabrum; stylus filiformis, glaber, breviter exsertus, stigmate leviter 2-lobato. — *C. pallida*, var. *unalaschcensis*, Cham. & Schlecht. in Linnaea, vol. ii. p. 581, partim. *C. pallida*, var. *miniata*, A. Gray in Amer. Journ. Sci. ser. 2, vol. xxxiv. p. 337. *Euchroma integrifolia*, Nutt. ex Benth. in DC. Prodr. vol. x. p. 532.—S. A. Skan.

The genus *Castilleja* is composed of herbs or undershrubs which appear to be parasitic on the roots of other plants and are for this reason, as is the case with many

Scrophulariaceae of the tribes *Gerardieae* and *Euphrasieae*, impossible or difficult to cultivate. Upwards of 150 species have been described, but many are of doubtful validity, and their number would probably be considerably reduced were the genus carefully revised. Mostly natives of Western North America, several are found in Central America, a few in the Andes of South America and one in Brazil and other parts of Tropical South America. One species, *C. pallida*, Kunth, extends from North-West America to Northern Asia, Arctic Russia and Lapland. *C. miniata*, popularly known as Bright Painted-cup, has a wide distribution in Western North America, ranging from Alaska southward along the higher mountains to California. It was originally described from specimens collected in 1826 by Douglas in the Blue Mountains of Northern Oregon and from others collected by Tolmie. The material figured was sent to Kew by Mr. H. J. Elwes of Colesborne, Cheltenham, and this was furnished by a plant which he received from Mr. F. R. S. Balfour of Dawyck, Peeblesshire, who sent it home with others during his visit to North-West America in 1913. The plants were lifted near Lake Agnes in the Canadian Rocky Mountains at about 8,000 feet elevation. Mr. Balfour was uncertain whether the species should be called *C. purpurascens*, Greenman, or *C. miniata*, but was inclined to think that it should be the latter, as it grows above timber line and is cardinal scarlet, occasionally pinkish and rarely whitish, whereas the former is more usual at lower altitudes and is generally of a purplish hue. *C. purpurascens* is not represented in the Kew Herbarium. Judging from the description there is nothing to distinguish it from *C. miniata* except the purplish colour. According to Gray's treatment of *Castilleja* in his Synoptical Flora the plant now figured should not be *C. miniata*, in which, he has stated, the calyx is about equally cleft before and behind, and the upper lip (galea) of the corolla is longer than the tube. The plant described here has the calyx more deeply cleft in front, and the upper lip of the corolla is distinctly longer than the tube. In these characters the subject of our figure agrees with the original types. *C. miniata* is by no means a new introduction into English gardens.

It is stated that it was first grown in this country in 1874. There is a plant in the Rock Garden at Kew which was received some years ago from the nursery of Sir J. Gore Booth, Lissadell, Sligo. This has thriven well in a partially shaded position in ordinary soil, and has proved quite hardy. It flowers annually in June and is easily propagated by seeds. The species has also flowered in the garden of Mrs. Longstaff at Wimbledon and in that of Mr. Balfour at Dawyck. When viewed in great numbers and amid natural surroundings it is an unusually striking plant. "For mass of colour," writes Mr. Balfour regarding *C. miniata* and allied species, "I never saw anything equal to them except perhaps a British poppy field." Several species of the genus have appeared in gardens from time to time; one of these, *C. indivisa*, Engelm., from Texas, is figured at t. 6376 of this work.

Description.—*Herb*, perennial; stems unbranched, ascending or erect from a woody stock, up to $1\frac{1}{2}$ ft. high, $\frac{1}{8}$–$\frac{1}{6}$ in. thick, sparingly hairy or glabrous downwards, green or faintly purplish, more or less dark purple when dry. *Leaves* alternate, sessile, lanceolate or the lower linear, narrowed or caudate at the tip, rather acute, entire or sparingly toothed near the tip, $1\frac{3}{4}$–3 in. long, $\frac{1}{6}$–$\frac{1}{2}$ in. wide, 3-nerved, puberulous, occasionally ciliate along the nerves and the margin. *Flowers* shortly pedicelled, at first closely, ultimately rather loosely clustered in a terminal raceme or spike 3–4 in. long. *Bracts* oblong-lanceolate, entire or incised or toothed at the tip, hardly longer than the calyx, glandular-pubescent, 3-nerved, the lower wholly green, the upper almost wholly bright pink. *Calyx* tubular, incurved, $\frac{3}{4}$–1 in. long, deeply cleft behind, more deeply in front, glandular-pubescent, pale green below, more or less pink upwards; lobes 4, triangular-lanceolate, $\frac{1}{5}$–$\frac{1}{3}$ in. long, $\frac{1}{15}$–$\frac{1}{12}$ in. wide at the base, acute or apiculate. *Corolla* 1–$1\frac{1}{3}$ in. long; tube tubular-funnel-shaped, incurved, $\frac{2}{3}$–$\frac{3}{4}$ in. long, pubescent, whitish; upper lip boat-shaped with involute edges and denticulate tip, closely shortly glandular-pubescent, pale green on the back, the margins pink; lower lip $\frac{2}{3}$–$\frac{3}{4}$ in. long, 3-lobed, adpressed to the base of the upper lip, green. *Stamens* 4, didynamous, the longer pair nearly as long as the corolla; filaments filiform, glabrous; anthers 2-celled, sparingly hairy. *Ovary* ellipsoid with the tip oblique, $\frac{1}{6}$–$\frac{1}{5}$ in. long, glabrous; style filiform, glabrous, shortly exserted; stigma shortly 2-lobed.

Tab. 8730.—Fig. 1, bract; 2, flower; 3, flower with the calyx laid open; 4 and 5, anthers with portions of filaments; 6, pistil:—*all enlarged.*

M.S. del. J.N. Fitch lith.

Vincent Brooks, Day Son Ltd imp.

L. Reeve & Co. London.

Tab. 8731.

ORTHROSANTHUS chimboracensis.

Mexico to Peru.

Iridaceae. Tribe Sisyrinchieae.

Orthrosanthus, *Sweet*; *Benth. et Hook. f. Gen. Plant.* vol. iii. p. 697.

Orthrosanthus chimboracensis, *Baker in Gard. Chron.* 1876, vol. vi. p. 67, *et in Journ. Linn. Soc. Bot.* vol. xvi. p. 112, *et in Handb. Irid.* p. 119; *Hemsl. Biol. Centr.-Amer.* vol. iii. p. 329; species *O. spicato*, Baker, affinis, inflorescentia paniculatim ramosa distinguenda.

Herba perennis; rhizoma breve, obliquum, lignosum. *Folia* linearia, 38 cm. longa, 7 mm. lata, equitantia, herbida, marginibus minutissime denseque serratis. *Pedunculus* rigidus, viridis, 50 cm. altus; bracteae primariae herbaceae, margine membranaceae pubescentesque, lanceolatae, acuminatae, 2·5 cm. longae, acute carinatae, in carina ciliatae; flores ad bractearum axillas fasciculati; bracteae secundariae ovato-lanceolatae, 1 cm. longae, quam primariae minus acute carinatae ciliataeque; bracteolae 2, ovato-lanceolatae, subobtusae, herbaceae marginibus latis membranceis praeditae; pedicelli 2–5 cm. longi. *Perianthium* lavandulaceo-azureum; segmenta subaequalia, 15 mm. longa, 10 mm. lata, patentia, obovata, exteriora breviter cuspidata, interiora apice obtusa basi subito contracta. *Filamenta* libera, subulata, 5 mm. longa; antherae lanceolatae, luteae, 5 mm. longae. *Styli* rami subulati, purpurei, 8 mm. longi. *Ovarium* cylindricum, nitidum, viride, 7 mm. longum. *Fructus* oblongus, trisulcatus, 2 cm. longus, 4 mm. diametro, obscure brunneus.—*O. Moritzianus*, Klotzsch ex Baker in Journ. Linn. Soc. Bot. vol. xvi. p. 112. *Moraea chimboracensis* et *M. acorifolia*, H. B. & K., Nov. Gen. et Sp. vol. i. p. 322. *Sisyrinchium Moritzianum*, Klatt in Linnaea, vol. xxxi. p. 378.—C. H. Wright.

The genus *Orthrosanthus*, "morning flower," includes seven species, five of which are confined to West Australia; a sixth species is said to occur in South Brazil; the seventh, which is here figured, has a wider range than any of the others, for it extends along the Andes from southern Mexico to Peru and Bolivia. The nearest ally of *Orthrosanthus* is *Sisyrinchium*, Linn., from which our genus differs in having free filaments. But the Brazilian species *O. spicatus*, Baker, is said to have the filaments united, and on this account it has been referred, in the "Flora Brasiliensis," to *Sisyrinchium*. If this treatment be accurate, then *O. chimboracensis*, the

species now figured, is the only member of the genus in South America. Though this species was originally described many years ago, it does not appear to have been introduced to cultivation until 1876, when it flowered in the collection of Mr. Tyerman. The material for our plate was supplied by Mr. H. J. Elwes, with whom it flowered at Colesborne, Cheltenham, in 1916. Mr. Elwes informs us that the record of the original source of his plant has been lost. In his collection it grows well in a cold greenhouse, and sets seeds freely.

Description.—*Herb*, perennial; rootstock short, oblique, woody. *Leaves* linear, 15 in. long, about $\frac{1}{4}$ in. wide, equitant, grassy, margins closely and finely serrate. *Peduncle* rigid, green, over $1\frac{1}{2}$ ft. high; primary bracts herbaceous, with membranous, pubescent margins, lanceolate, acuminate, 1 in. long, sharply keeled, ciliate on the keel; flowers fascicled in the bract-axils; secondary bracts ovate-lanceolate, $\frac{2}{5}$ in. long, less sharply keeled and less ciliate than the primary ones; bracteoles 2, ovate-lanceolate, rather obtuse, herbaceous with broad membranous margins; pedicels 1–2 in. long. *Perianth* lavender-blue; segments almost equal, $\frac{2}{3}$ in. long, $\frac{2}{5}$ in. wide, spreading, obovate, the outer shortly cuspidate, the inner blunt at the tip, suddenly contracted at the base. *Filaments* free, subulate, $\frac{1}{5}$ in. long; anthers lanceolate, yellow, $\frac{1}{5}$ in. long. *Style-arms* subulate, purple, $\frac{1}{3}$ in. long. *Ovary* cylindric, shining green, over $\frac{1}{4}$ in. long. *Fruit* oblong, 3-sulcate, $\frac{3}{4}$ in. long, $\frac{1}{6}$ in. wide, dull brown.

Tab. 8731.—Fig. 1, flower, with perianth removed; 2 and 3, anthers; 4, style-arms; 5, fruit; 6, seeds; 7, sketch of an entire plant:—*all enlarged except* 5, *which is of natural size, and* 7, *which is much reduced.*

M.S. del. J.N. Fitch lith.

Vincent Brooks, Day & Son Lith. Imp.

L. Reeve & Co. London.

Tab. 8732.

DAPHNE Giraldii.

China.

Thymelaeaceae. Tribe Euthymelaeeae.

Daphne, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. iii. p. 190.

Daphne Giraldii, *Nitsche, Beitr. Kenntn. Gatt. Daphne* (Diss.) p. 7; *Rehder in Sargent, Pl. Wilson.* vol. ii. p. 545; inter species subsectionis *Alpinarum*, Keissl., floribus aureis glaberrimis distinctissima.

Frutex erectus, 0·75 m. altus, glaberrimus. *Folia* primo anno decidua, alterna, sessilia, anguste oblanceolata, subacuta vel obtusa, saepe minute apiculata, basin versus magis minusve attenuata, 4–6 cm. longa, vix 1 cm. lata, papyracea, glaberrima. *Flores* ad ramorum apices capitato-glomerata, pauci (in planta culta ad 8), subsessiles, ebracteati, glaberrimi, aurei. *Receptaculum* tubulosum, 6–8 mm. longum, 2·5 mm. latum. *Sepala* ovata, acuta, ad 4 mm. longa. *Petala* 0. *Staminum* series inferior paulo supra medium tubum, superior in faucibus inserta. *Ovarium* sessile; stigma depresso-globosum, sessile. *Fructus* ovoideus, 8 mm. latus.—*D. tangutica*, Pritz. in Engl. Bot. Jahrb. vol. xxix. p. 481; non Maxim.—O. Stapf.

The *Daphne* here figured was first met with by Père Giraldi, after whom it is named, in 1894 on Mt. Tue-lian-pu in Northern Shensi. It was collected by him again in 1897 in other localities in the Tsin-ling range, and in 1899 it was found by Mr. H. Scallan on Mt. Ugosan in the same province. Some years later it was found in Western Kansu, at elevations of about 9,000 feet, on the mountains to the west of the Tow River by Mr. W. Purdom when collecting on behalf of Messrs. J. Veitch and Sons, by whom it was introduced to cultivation. The material for our plate of *D. Giraldii* has been supplied by Mr. G. W. E. Loder from a plant in his garden at Wakehurst Place, Ardingly, Sussex. This plant, which was obtained from Messrs. Veitch in 1913, has been grown since then in an open border, where it has proved quite hardy and has developed into a bush two and a half feet high with a crown four feet in circumference. It has flowered fairly freely at Wakehurst Place, but does not set seed very readily. Mr.

Loder informs us that he has been able to layer the plant and has succeeded in striking a few cuttings. *D. tangutica*, Maxim., the species with which it has been confused, differs in having persistent leaves and bracteate inflorescences. The remaining species of the section *Alpinae* have white, silky flowers, and all occupy areas which lie to the north and west of that in which *D. Giraldii* occurs.

DESCRIPTION.—*Shrub*, erect, $2\frac{1}{2}$ ft. in height, quite glabrous. *Leaves* deciduous, alternate, sessile, narrowly oblanceolate, obtuse or slightly acute, often finely apiculate, more or less narrowed to the base, $1\frac{1}{2}$–$2\frac{1}{3}$ in. long, about $\frac{1}{3}$ in. wide, papery, quite glabrous. *Flowers* capitately clustered at the tips of the branches, rather few (in cultivated plants about 8 to a cluster), nearly sessile, bractless, quite glabrous, golden yellow. *Receptacle* tubular, $\frac{1}{4}$–$\frac{1}{3}$ in. long, $\frac{1}{10}$ in. wide. *Sepals* ovate, acute, up to $\frac{1}{6}$ in. long. *Petals* 0. *Stamens* 2-seriate; the lower inserted a little above the middle of the tube; the upper inserted in the throat. *Ovary* sessile; stigma depressed globose, sessile. *Fruit* ovoid, $\frac{1}{3}$ in. in diameter.

TAB. 8732.—Fig. 1, flower; 2, the same, in vertical section; 3 and 4, anthers; 5, fruit, nearly ripe, with subtending leaf:—*all enlarged except* 5, *which is of natural size.*

M.S. del. J.N. Fitch lith.

Vincent Brooks, Day & Son Lt.d imp

Tab. 8733.

PRUNUS subhirtella, var. autumnalis.

Japan.

Rosaceae. Tribe Pruneae.

Prunus, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. i. p. 609.

Prunus subhirtella, *Miq. in Ann. Mus. Bot. Lugd.-Bat.* vol. ii. p. 91, **var. autumnalis,** *Makino in Tokyo Bot. Mag.* vol. xxii. p. 117 (1908); *Wilson in Cherries of Japan*, p. 12; varietas distincta auctumno vergente nec tempore verno florescens, corollam petalis 10–15 nec 5 tantum instructam exhibens, ceterum cum typo arcte congruens.

Arbor parva, 3–6 m. alta; ramuli primum pubescentes mox fere glabri. *Folia* ovata vel ovato-lanceolata, acuminata, basi late cuneata vel rotundata, margine serrata vel interdum duplicato-serrata dentibus apice glandulosis, 4–9 cm. longa, 1·2–3 cm. lata, primum utrinque pubescentia, demum supra glabrescentia, supra laete viridia, subtus hebetia; petiolus pubescens, 1·2–2 cm. longus; glandulae marginales prope laminae basin 1–2, conspicuae. *Flores* auctumno vergente secus ramulos foliatos abbreviatos axillares, auctumno exacto secus ramulos nudos ex axillis foliorum delapsorum enati, odorati, 2·5–3 cm. lati; pedicelli glabri vel parce pilosi, 2·5–4 cm. longi, 1–3 fasciculatim aggregati, basi squamis parvis membranaceis circumdati, saepius medium versus bracteis 1–2 laciniatis instructi. *Receptaculum* tubulosum vel infundibulare, glabrum vel parce pilosum. *Sepala* 5, ovato-lanceolata, serrata, glabra, 6 mm. longa. *Petala* 10–15, pallide punicea vel albida, obcuneata vel ovalia, acuta vel truncata, saepe emarginata. *Stamina* indefinita; filamenta glabra, punicea; antherae luteae. *Ovarium* ovoideum, apicem versus parce pilosum; stylus glaber. *Fructus* ignotus.—*P. autumnalis*, Koehne in Plant. Wils. vol. i. p. 259. *P. makinoana*, Koehne in Fedde, Rep. Spec. Nov. vol. xi. p. 271. *P. microlepis*, Bean in Trees & Shrubs, vol. ii. p. 243; non Koehne. *P. microlepis*, var. *Smithii*, Koehne apud Bean in Kew Bull. 1914, p. 51. *P. Miqueliana*, Hort.; non Maxim.—W. J. Bean.

The Cherry here figured was originally introduced to the United Kingdom by Mr. T. Smith of Newry, and distributed by him as *Prunus Miqueliana*, the name under which he had received it from Japan. The plant from which the material for our plate was gathered is one in the Kew collection which was purchased from Mr. Smith in 1912. It flowered in December of that year, and on being compared with an authentic example of *P. Miqueliana* was found to differ from that species. It was then sent to Professor Koehne of Berlin, who expressed the view that it was a variety of his *P. microlepis*. The material at his disposal was, however, very incomplete,

and since then this and other Japanese cherries have been very carefully studied in the living state in their native country by Mr. E. H. Wilson, who has definitely concluded that the subject of our illustration is the autumn-flowering variety of *P. subhirtella*, Miq., figured at t. 7508 of this work. The confusion as to the identity of this tree is shown by the involved nomenclature quoted by Mr. Bean. This confusion appears to have resulted from the variable shape of the receptacle which while usually funnel-shaped or tubular may be campanulate or even tumid below the middle. This variability is largely dependent on the degree of "doubleness" in the flower. Coming into blossom as it does in October and bearing delightfully fragrant flowers which continue to appear until December, this tree forms a charming accession to our flora. The figure given was prepared in October, 1916, while the tree was still in leaf, and was then as gay as any spring-flowering cherry. At Kew it does not flower so freely during the two latter months when the leaves have fallen; this, however, is perhaps only because weather conditions are then usually more inclement. According to Wilson this variety in Japan does sometimes, like the typical *P. subhirtella*, produce flowers in April, although even then it does so sparingly; at Kew it has not, so far, produced any flowers in spring.

Description.—*Tree* of bushy habit, 10–20 ft. high, branchlets pubescent when young, nearly glabrous by autumn. *Leaves* ovate to ovate-lanceolate, rounded to broadly cuneate at the base, acuminate, serrate, sometimes biserrate, the teeth gland-tipped, 1½–3½ in. long, ½–1¼ in. wide, pubescent on both surfaces when young, becoming bright green and glabrescent above, dull green beneath; petiole ½–¾ in. long, pubescent, with one or two conspicuous glands near the base of the blade. *Fascicles* axillary, 1–3-flowered, appearing on short leafy twigs in October, or on the naked shoots in November and December. *Flowers* fragrant, 1–1¼ in. wide; pedicels 1–1½ in. long, surrounded at the base by a cluster of short membranous scales, slightly pilose or glabrous, often furnished towards the middle with one or two laciniate bracts. *Receptacle* funnel-shaped to tubular, glabrous or slightly pilose. *Sepals* 5, ovate-lanceolate, serrate, glabrous, ¼ in. long. *Petals* 10 to 15 (5 in the type), pale pink, obcuneate to oval, truncate to acute and usually notched at the apex. *Stamens* numerous, the filaments glabrous and half as long as the petals; anthers yellow. *Ovary* ovoid, slightly pilose towards the summit; style slightly overtopping the stamens, glabrous. *Fruit* not seen.

Tab. 8733.—Fig. 1, base of leaf, showing glands; 2, a flower in vertical section, the petals and pistil removed; 3 and 4, anthers; 5, pistil:—*all enlarged*.

M.S. del. J.N. Fitch. lith

Vincent Brooks, Day & Son Lt^d imp

L Reeve & C^o London.

Tab. 8734.

MEGACARPAEA POLYANDRA.

Himalaya.

CRUCIFERAE. Tribe THLASPIDEAE.

MEGACARPAEA, *DC.*; *Benth. et Hook. f. Gen. Plant.* vol. i. p. 91.

Megacarpaea polyandra, *Benth. ex Madden in Proc. Bot. Soc. Edinb.* 1855, p. 41; *Strach. et Winterb. ex Benth. in Hook. Kew Journ.* vol. vii. p. 353, tt. 7, 8; *Hook. f. et Thoms. in Journ. Linn. Soc.* vol. v. p. 176; *Hook. f. et T. And. Fl. Brit. Ind.* vol. i. p. 161; *Gard. Chron.* 1892, vol. xii. p. 17, fig 4 et 1916, vol. lix. p. 255, fig. 107, 108; species *M. bifidae*, Benth. affinis, foliorum segmentis dentatis et siliquarum forma distincta.

Herba perennis, radice versus collum ad vel ultra 13 cm. crassa, caulibus saepe pluribus e collo ortis cum inflorescentiis ad 2 m. altis, robustis. *Folia* basalia pinnatisecta, ultra 0·75 m. longa, segmentis utrinque 8–9 lanceolatis acuminatis varie serrato-dentatis vel denticulatis, subtus sparse molliter pubescentibus vel subglabris, caulinis similibus nisi minoribus segmentisque paucioribus vel summis integris lineari-lanceolatis. *Inflorescentia* ampla, paniculata, rhachi ramis pedicellisque magis minusve villosulis; pedicelli ad 1·5 cm. longi. *Sepala* late elliptica, obtusissima, 5 mm. longa, membranacea, albida. *Petala* obovata, sepala aequantia, crenulata, luteo-albida. *Glandulae* tot quot stamina, virides, ad filamentorum bases. *Stamina* 8–15, filamentis crassiusculis petalis fere aequilongis, antheris 1·5 mm. longis. *Ovarium* lateraliter compressum, ambitu fere orbiculare; stigma capitatum, subsessile. *Siliqua* juvenilis orbicularis, emarginata, mox distincte et saepissime inaequaliter biloba, lobis alatis, matura fuscescens, saepe lobo uno parvo hebetato altero orbiculari ad 2·5 cm. diametro ala 8 mm. lata inclusa. *Semen* unicum, ambitu ellipticum, applanatum, 1 cm. longum, radicula accumbente.—O. STAPF.

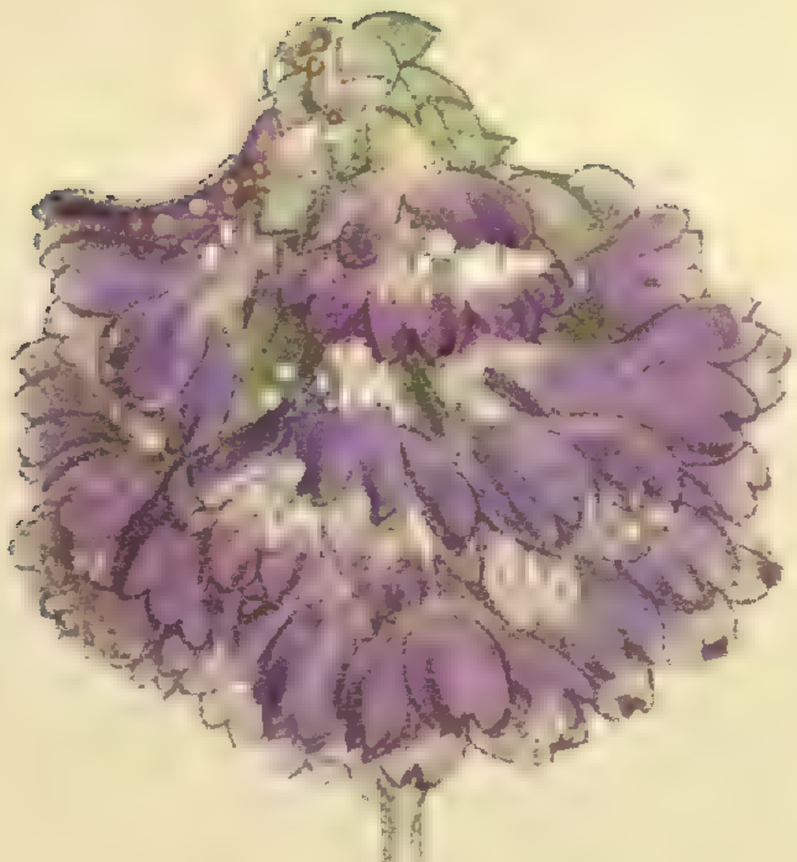
The genus *Megacarpaea* is widely spread in Asia from the Caspian Sea to Western China, and from the Altai range to the Western Himalaya. It includes some seven species, one of which, *M. bifida*, Benth., confined to Kashmir, and a second, *M. polyandra*, Benth., now figured, occurring both in Kashmir and Kamaon, deviate remarkably in the number and disposition of their stamens from the arrangement characteristic of the natural family *Cruciferae* to which the genus belongs. The presence of the genus in the Himalaya was first ascertained by Dr. H. Falconer, who obtained flowering specimens of *M. polyandra* in Kashmir in 1838. Specimens, in leaf

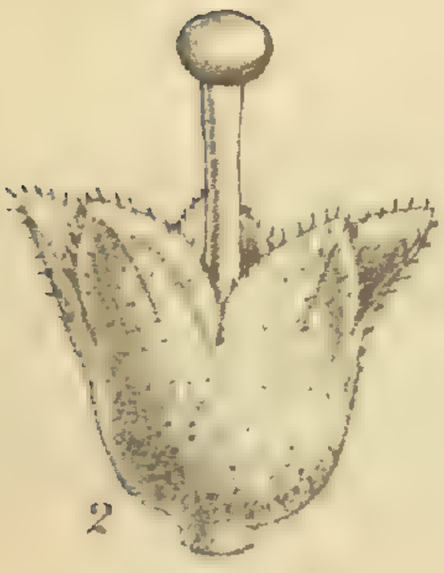
only, were obtained by Mr. J. E. Winterbottom in the same province in 1847. In 1848 it was gathered for the first time in Kamaon, in flower, by (Captain afterwards General Sir) R. Strachey; and in 1849 it was met with also in Kamaon by Colonel E. Madden in flower in May and June, in fruit during September and October. Since then it has been met with in Kashmir by Dr. J. E. T. Aitchison, and in both provinces by Mr. J. F. Duthie who gathered it, in flower, in Kamaon in 1886, and, in fruit, in Kashmir in 1892. For the introduction of the species to this country, horticulture is indebted to Colonel Madden, by whom seeds were sent to Glasnevin in 1849. The plant raised there by Mr. D. Moore throve well and grew to a great size, but did not flower until 1855. Plants raised from seed subsequently introduced flowered in 1889 in the garden of Sir J. D. Hooker at the Camp, Sunningdale, and in 1892, under the care of Mr. F. Burbidge, in that of Trinity College, Dublin. At Kew and at Cambridge, on the other hand, where plants were grown for many years, *M. polyandra* never produced flowers. The same was the case with two other plants, received from Kew, which grew for many years in the garden of the late Canon Ellacombe, at Bitton. In 1908 the Bitton plants were transferred to the garden of Mr. G. H. Wollaston, Flaxley Cottage, Flax Bourton, where at last one of them flowered in 1916. The material for our illustration was kindly supplied by Mr. Wollaston from this plant, which has thriven quite well in a herbaceous border in ordinary soil and with no special treatment. After flowering the plant died down, but recovered itself in the following spring. The nearest ally of *M. polyandra* is *M. bifida*. But while the two share the peculiarity of possessing more than six stamens they are readily distinguished by their leaves, the segments of which are toothed in *M. polyandra*, quite entire in *M. bifida*; and by their fruits, usually unequally lobed and never deeply divided in *M. polyandra*, almost always equally lobed and always very deeply divided in *M. bifida*. They share further the peculiarity of shy and erratic flowering; in the case of *M. bifida*, indeed, which has long been in cultivation at Kew, there is no record as yet of its having flowered in this country. In the

Himalaya *M. polyandra* occurs on the open downs above the tree-limit at elevations of 10,000–13,000 feet; as late as 1872 it was believed that *M. bifida*, which has been gathered at elevations of under 8,000 feet, was confined to a lower zone. This is now known not to be the case; *M. bifida* was collected by Dr. Giles, in 1885, at 12,000 feet above sea-level in Kashmir. The roots of *M. polyandra*, which is known to the mountaineers of Kamaon as the Rugi, are pounded and eaten as a condiment; in Kashmir the leaves are used as a vegetable.

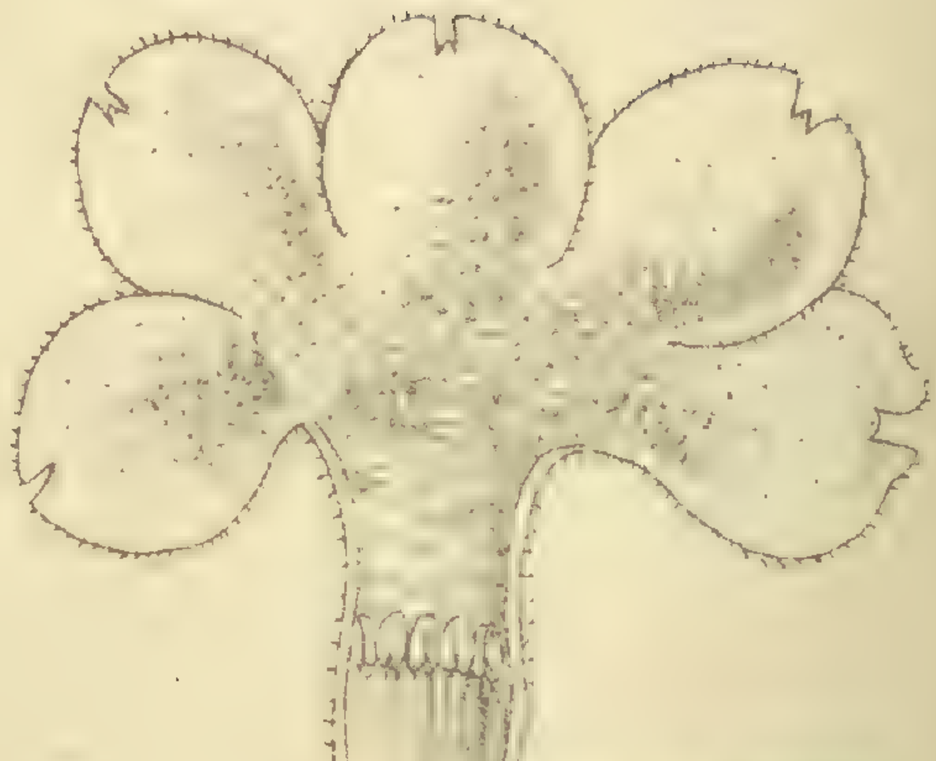
DESCRIPTION.—*Herb*, perennial; root 4–5 in. thick at the crown, giving off several stout stems which, when in flower, are 6–8 ft. high. *Leaves* pinnatisect; basal 2½ ft. long, segments about 8–9 on each side, lanceolate, acuminate, serrate-dentate or denticulate, sparingly softly pubescent or nearly glabrous beneath; cauline similar but smaller, with fewer segments or the uppermost entire and linear-lanceolate. *Inflorescence* very large, panicled, the rachis, branches and pedicels more or less finely hairy; pedicels up to ⅔ in. long. *Sepals* wide-elliptic, quite obtuse, ⅕ in. long, membranous, white. *Petals* obovate, as large as the sepals, crenulate, yellowish-white. *Glands* at the base of the filaments as many as the stamens, green. *Stamens* 8–15, filaments rather stout, almost as long as the petals; anthers small. *Ovary* compressed laterally, almost orbicular in outline; stigma capitate, nearly sessile. *Siliqua* when young orbicular, emarginate, soon distinctly but usually unequally 2-lobed; lobes winged, when ripe tawny, often with one small dull-green lobe and with the other orbicular, 1 in. across, including the ⅓ in. wide wing. *Seed* solitary, elliptic in outline, flattened, ⅖ in. long; radicle accumbent.

TAB. 8734.—Fig. 1, flower-bud; 2, flower; 3, stamens and pistil; 4, anther; 5, sketches of entire plant, from a photograph:—*all enlarged except* 5, *which is much reduced.*

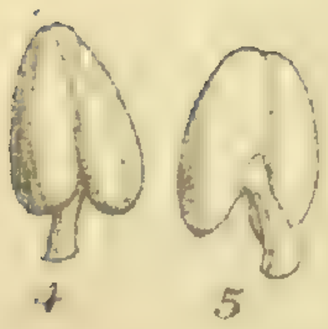




2



3



4

5

M S & J W Wheeldon, Imp.

Vincent Brooks, Day & Son Lt^d imp

L. Reeve & C^o London

Tab. 8735.

PRIMULA nutans.

Yunnan.

Primulaceae. Tribe Primuleae.

Primula, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 631.

Primula (§ Soldanelloides) **nutans,** *Delavay ex Franch. in Bull. Soc. Bot. France,* vol. xxxiii. p. 69 (1886); *Pax in Engl. Bot. Jahrb.* vol. x. p. 193 (1889); *Forbes et Hemsl. in Journ. Linn. Soc. Bot.* vol. xxvi. p. 40 (1889); *Pax et Knuth, Primulaceae,* p. 94 (1905); *Balf. f. in Journ. Roy. Hort. Soc.* vol. xxxix. p. 153 (1913); affinis *P. penduliflorae,* Franch., sed foliis duplo repando-denticulatis angustioribus differt.

Herba ut videtur monocarpica, usque ad 30 cm. alta, basi leviter fibrosa. *Folia* petiolata, elliptico-oblanceolata, apice obtusissima vel rotundata, basi in petiolum late alatum sensim attenuata, 6–15 cm. longa, 3–8·5 cm. lata, duplo repando-denticulata, tenuiter chartacea vel membranacea, utrinque breviter et mollissime pubescentia; nervi laterales utrinsecus 8–10, a costa sub angulo 45° abeuntes, utrinque prominuli; petioli 3–4 cm. longi, late membranaceo-alati. *Flores* 6–10, nutantes, in capitulum longe pedunculatum dispositi, sessiles; pedunculi apicem versus albo-farinosi, foliis duplo longiores. *Calyx* late campanulatus; tubus 5 mm. longus, viridis, extra albo-pulverulentus, lobis late ovatis acutis 2·5 mm. longis 2 mm. latis. *Corolla* violacea; tubus cylindricus, 0·75–1 cm. longus, extra albo-pulverulentus, in limbum 5-lobatum circiter 2 cm. diametro expansus, lobis ovato-orbicularibus circiter 7 mm. diametro apice inter dentes duos minutos mucronulatis. *Antherae* infra tubi medium insertae, late ovoideae, 1·5 mm. longae. *Stylus* 7 mm. longus, stigmate depresso-capitato.—J. Hutchinson.

The charming *Primula* here described and figured is a denizen of woodlands at high altitudes in Yunnan, where it was originally discovered by the late Abbé Delavay, by whom it was named *P. nutans*. Its introduction to our gardens we owe to Mr. G. Forrest, by whom seeds were obtained and transmitted to Mr. J. C. Williams, Caerhays Castle, Cornwall. The plant figured was raised from seed presented to Kew by Mr. Williams in 1915. The species is a member of the section distinguished by Professor Bayley Balfour as *Soldanelloides*, and is not easily distinguished from another described later by Mr. Franchet as *P. penduliflora*, of which our material is not altogether adequate. The two appear to differ as

regards foliage, the leaves of *P. penduliflora* being only simply dentate with the teeth more distant. The section includes several beautiful Himalayan species, most of which are in cultivation, and all of which have rather few nodding or reflexed sessile flowers arranged in more or less globose heads. Among these may be mentioned *P. Reidii*, Duthie, figured in this work at t. 6961, and *P. Wattii*, King, figured at t. 8456. The representative species of the section is taken by Professor Balfour to be *P. spicata*, Franch. At Kew *P. nutans* has grown well and flowered freely in the Rock Garden and also in pots in a cold frame. It is evidently quite hardy. It produces good seeds, but perishes after flowering.

Description.—*Herb*, in cultivation monocarpic, up to 1 ft. high; base somewhat fibrous. *Leaves* petioled, elliptic-oblanceolate, quite obtuse or rounded at the tip, gradually narrowed downwards with a broad winged petiole, 2½–6 in. long, 1¼–1½ in. wide, doubly repand-toothed, thinly papery or membranous, shortly softly hairy on both surfaces; lateral nerves 8–10 along each side of the midrib, which they leave at an angle of 45°, raised on both surfaces; petiole 1½–1¾ in. long, with broad membranous wings. *Flowers* 6–10, nodding, sessile, crowded in a long-stalked head; scape white-mealy towards the top, twice as long as the leaves. *Calyx* wide-campanulate; tube ⅕ in. long, green, white-mealy outside, lobes wide-ovate, acute, $\frac{1}{10}$ in. long, $\frac{1}{12}$ in. wide. *Corolla* violet; tube cylindric, ⅓–⅖ in. long, white-mealy outside, expanding into a 5-lobed limb about ¾ in. across, with ovate-orbicular lobes over ¼ in. across, which are mucronulate at the apex between two small teeth. *Anthers* inserted below the middle of the tube, wide-ovoid, $\frac{1}{16}$ in. long. *Style* over ¼ in. long; stigma depressed-capitate.

Tab. 8735.—Fig. 1, part of a leaf; 2, calyx and pistil; 3, corolla, laid open; 4 and 5, anthers; 6, pistil:—*all enlarged*.

M.S del J.N.Fitch.lith

Vincent Brooks Day & Son Lith.

L.Reeve & Cº London.

Tab. 8736.

RHODODENDRON Fargesii.

China.

Ericaceae. Tribe Rhodoreae.

Rhododendron, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 599.

Rhododendron Fargesii, *Franch. in Journ. de Bot.* vol. ix. p. 390 (1895); *Hemsl. et E. H. Wils. in Kew Bulletin,* 1910, p. 109; *Gard. Chron.* 1912, vol. li. p. 252, et vol. lii. p. 4, fig. 4; *Rehder et E. H. Wils. in Sargent, Pl. Wilson.* vol. i. p. 540 (1913); *Bean, Trees & Shrubs,* vol. ii. p. 354 (1914); species affinis *R. erubescenti,* Hutchinson, sed filamentis glabris distinguenda.

Frutex valde ramosus; rami nitidi, glabri; ramuli hornotini brevissimi, purpurei, parce glanduloso-lepidoti. *Folia* pauca, oblonga vel oblongo-elliptica, utrinque rotundata vel basi subcordata, apice minute mucronata, 5–12 cm. longa, 2·5–4 cm. lata, tenuiter coriacea, glabra, infra reticulata, pallidiora; nervi laterales tenuissimi, numerosi, marginem versus ramosi et evanidi; petioli usque ad 2 cm. longi, purpurascentes. *Flores* 6–7, umbellati; perulae late ovatae, ciliatae, extra glabrae; pedicelli breves, vix 1 cm. longi, pilis brevibus apice glandulosis dense induti. *Calyx* brevissimus, undulatus, extra glanduloso-pubescens. *Corolla* alabastro coccinea demum rosea, late infundibuliformis, 6–7-loba; tubus 3–3·5 cm. longus, extra glaber; lobi suborbiculares, erecto-patentes, 1·5–2 cm. lati. *Stamina* circiter 14, paullo exserta; filamenta glabra; antherae purpurascentes, 3 mm. longae. *Ovarium* circiter 8-loculare, plerumque pilis paucis glandulosis instructum; stylus staminibus paullo longior, coccineus, glaber, stigmate lobulato coronatus. *Capsula* haud visa.—J. Hutchinson.

The charming *Rhododendron* here figured is a native of China, where it is common in the mountains of Eastern Szechuan and Western Hupeh. It was originally discovered near Tchen-keou-tin, in the former province, by Farges, in whose honour it was named *R. Fargesii* by Franchet in 1895. It was met with again in the latter province by Mr. E. H. Wilson, in 1901, when collecting on behalf of Messrs. Veitch. In Western Hupeh, Wilson found it to be abundant in the upper woodlands, never occurring at elevations below 6,000 feet. The species was raised in their Coombe Wood nursery by Messrs. Veitch from seed supplied by Wilson, and the material for our plate has been obtained from a plant purchased

for Kew from Messrs. Veitch in 1913. At Kew it is not a very leafy or free-growing shrub, and although it is apparently hardy enough to withstand frosts as severe as those experienced during the winter of 1916–17, it thrives much better in the south-western counties. Blossoming as it does in April, its flowers are liable to damage by late frosts, a disadvantage which it shares with many other Chinese species of the genus. When seen at its best *R. Fargesii* is very pleasing in the soft colouring of its blossoms which, according to Wilson, vary in their native woods from deep rosy red to nearly or quite white. Its nearest ally is *R. erubescens*, Hutchinson, figured at t. 8463 of this work, but it is readily distinguished from that species by its perfectly glabrous filaments. The nearest Himalayan species is *R. campylocarpum*, Hook. f., a denizen of high altitudes in Sikkim, figured at t. 4968 of this work, which differs in having yellow flowers and slightly pulverulent leaves.

Description.—*Shrub*, branching freely; branches glabrous, polished; young twigs very short, purple, sparsely clothed with glandular scales. *Leaves* few, oblong or elliptic-oblong, rounded and finely mucronulate at the tip, rounded or slightly cordate at the base, 2–4½ in. long, 1–1½ in. wide, thinly leathery, glabrous, finely reticulate and rather paler beneath; lateral nerves numerous, very slender, branching and becoming obsolete near the margin; petiole up to ¾ in. long, purplish. *Flowers* in umbellate 6–7-flowered trusses; bud-scales wide ovate, ciliate, glabrous externally; pedicels short, about ⅓ in. long, densely clothed with short gland-tipped hairs. *Calyx* very short, glandular-pubescent outside; its margin wavy. *Corolla* pink in bud, at length rose-coloured, wide funnel-shaped, 6–7-lobed; tube 1¼–1⅓ in. long, glabrous outside; lobes nearly orbicular, slightly spreading, ⅔–¾ in. wide. *Stamens* about 14, slightly exserted; filaments glabrous; anthers purplish, ⅕ in. long. *Ovary* about 8-celled, usually with a few glandular hairs; style rather longer than the stamens, pink, glabrous; stigma lobulate. *Capsule* unknown.

Tab. 8736.—Fig. 1, portion of a leaf, showing the venation; 2, calyx and pistil; 3 and 4, stamens; 5, anther; 6, transverse section of ovary:—*all enlarged.*

M S del. J N Fitch lith

Vincent Brooks, Day & Son Lt^d imp.

Tab. 8737.

SARCOCHILUS solomonensis.

Solomon Islands.

Orchidaceae. Tribe Vandeae.

Sarcochilus, *R. Br.*; *Benth. et Hook. f. Gen. Plant.* vol. iii. p. 575.

Sarcochilus solomonensis, *Rolfe in Kew Bulletin*, 1908, p. 72; species a *S. Engleriano*, Kraenzl., foliis latioribus, floribus majoribus, labelli calcare oblongo et disco cristato distincta.

Herba epiphytica, habitu *Phalaenopseos*; caulis brevis, erectus. *Folia* disticha, recurva, oblonga, obtusa vel oblique et brevissime bidentata, 20–25 cm. longa, 5–6 cm. lata. *Scapi* axillares, suberecti vel arcuati, interdum subpenduli, 30–35 cm. longi; racemi subdensi, multiflori; bracteae patentes, triangulari-ovatae, acuminatae, 2–3 mm. longae, basi concavae; pedicelli patentes, graciles, 1·5 cm. longi. *Flores* gilvi, brunneo-punctati. *Sepala* subpatentia, obovata, obtusa, 1·2–1·5 cm. longa, basi cuneato-attenuata. *Petala* subpatentia, sepalis subaequalia. *Labellum* brevissime unguiculatum, 3-lobum, 0·6–0·8 cm. longum, ungue lineari, lobis lateralibus subpatentibus oblongis obtusis vel minute dentatis, lobo intermedio minuto quadrato apice denticulato, disco cristato, calcare erecto oblongo obtuso. *Columna* oblonga, circiter 2 mm. longa. *Pollinia* 2, obovoidea; stipes clavato-oblonga; glandula squamiformis.—R. A. Rolfe.

The interesting *Sarcochilus* here figured was originally described from herbarium material accompanied by a photograph of an entire plant communicated to Kew by Mr. C. M. Woodford from Tulagi, in the Solomon Islands, in which archipelago he reported the species to be common. Subsequently a living plant was brought from the archipelago to England by Sir Everard im Thurn, and presented to Kew in September, 1910. Here it has been grown in a tropical house, in company with various members of the genus *Phalaenopsis*, to some of which our plant, when out of bloom, bears a considerable resemblance. Like these it thrives remarkably well under conditions of great heat and moisture, with dense shade during bright weather. Under these conditions it flowered in June, 1916, when the figure here supplied was prepared. Though so like a *Phalaenopsis* in habit, the plant differs greatly in its inflorescence and floral

structure from any member of that genus. The flowers of *S. solomonensis*, as is the case with many members of the genus *Sarcochilus*, are singularly fugacious, but after a short interval another crop of bloom is borne by the same inflorescence. The genus has a wide range in South-eastern Asia and extends from India to North Australia.

DESCRIPTION.—*Herb*, epiphytic, in habit resembling a *Phalaenopsis*; stem short, erect. *Leaves* distichous, recurved, oblong, obtuse or oblique and slightly 2-toothed at the tip, 8–10 in. long, 2–2¼ in. wide. *Sepals* axillary, nearly straight or somewhat curved, occasionally slightly pendulous, 12–14 in. long; racemes rather dense, very many-flowered; bracts spreading, triangular-ovate, acuminate, $\frac{1}{12}$–$\frac{1}{8}$ in. long, concave at the base; pedicels spreading, slender, nearly $\frac{2}{3}$ in. long. *Flowers* pale buff, with small brown spots. *Sepals* somewhat spreading, obovate, obtuse, $\frac{1}{2}$–$\frac{2}{3}$ in. long, cuneately narrowed at the base. *Petals* somewhat spreading, about as large as the sepals. *Lip* shortly clawed, 3-lobed, $\frac{1}{4}$–$\frac{1}{3}$ in. long; claw linear; lateral lobes somewhat spreading, oblong, obtuse or minutely toothed; mid-lobe very small, quadrate, toothed at the tip; disk crested; spur erect, oblong, obtuse. *Column* oblong, about $\frac{1}{12}$ in. long. *Pollinia* 2, obovoid; stipe clavate-oblong; gland scale-like.

TAB. 8737.—Fig. 1, lip and column; 2, part of lip; 3, anther-cap; 4, pollinia; 5, sketch of an entire plant:—*all enlarged except* 5, *which is much reduced.*

M.S. del. J.N. Fitch lith.

Vincent Brooks, Day & Son Lt.d imp

L. Reeve & Co. London.

Tab. 8738.

SECHIUM edule.

Tropical America.

Cucurbitaceae. Tribe Sicyoideae.

Sechium, *P. Br.*; *Benth. et Hook. f. Gen. Plant.* vol. i. p. 837; *Cogn. in DC. Mon. Phan.* vol. iii. p. 900.

Sechium edule, *Sw. Fl. Ind. Occ.* vol. ii. p. 1150; *Willd. Spec. Pl.* vol. iv. p. 427; *Griseb. Fl. Brit. West Ind.* p. 236; *Naudin in Ann. Sc. Nat.* sér. iv. vol. xviii. p. 205; *Gard. Chron.* 1865, p. 51, cum icon. (fr.) *et* 1900, vol. xxviii. p. 450, cum icon.; *A. S[mith] in Treas. Bot.* vol. ii. p. 1044; *Cogn. in Mart. Fl. Bras.* vol. vi. pars iv. p. 110, t. 35 *et* l.c. p. 901; *Kew Bull.* 1887, Aug., pp. 6–9 *et* 1896, p. 128; *Agr. Gaz. New South Wales*, vol. iv. (1893), p. 416, t. 28; *Cooke in U.S. Dep. Agric. Bull.* 28 (1901), pp. 1–31, tt. 1–8; *Agr. Prat. de Pays Chauds*, vol. vii. pars ii. p. 5, tt. I. & II.; *R. I. Lynch in Garden*, 1917, vol. lxxxi. p. 309, cum icon.; species unica.

Frutex monoicus, alte scandens, caule ultra 10 cm. diametro, ramis sulcatis glabris laevibus. *Folia* membranacea, rotundato-cordata, sinu lato vel angusto et profundo, 3–5-angulato-lobata, lobis integris vel rarius minute denticulatis, intermedio acuminato, ad 25 cm. lata, supra scabra, subtus praeter nervos venasque laevia; petiolus glaber, laevis, ad 15 cm. longus. *Cirrhi* glabri, ad 5–6 cm. indivisi, deinde plerumque 3-fidi. *Flores* ♂ racemosi; racemi pedunculo nudo ad 30 cm. longo suffulti, congesti brevesque vel in fasciculos varie distantes soluti; pedicelli perbreves, albo-hirtelli. *Receptaculum* hemisphaericum, haud altum, extra subglabrum. *Sepala* lineari-subulata vel subulata, circiter 3 mm. longa. *Corolla* fere 5-partita, segmentis ovatis acutis 5–6 mm. longis albo-flavidis. *Columna staminalis* 1–1·5 mm. longa; antherae liberae, 2–2·5 mm. longae, una 1-locularis, caeterae 2-loculares, loculis sigmatoideis. *Flores* ♀ solitarii vel bini, passim cum ♂ racemis ex eadem axilla orti, breviter pedunculati, floribus ♂ quoad calycem corollamque similes. *Ovarium* inferum, obovoideum, apice subito in collum tenue breve constrictum, leviter 5-sulcatum, saepe hirtellum. *Stylus* 2–3 mm. longus; stigma depresso-capitatum. *Fructus* magnus, magis minusve pyriformis, carnosus, profunde sulcatus, laevis vel spinulis mollibus echinatus. *Semen* 1, ovatum, compressum; testa lignosa, laevis. *Embryo* cotyledonibus carnosis, saepe germinans dum fructu inclusus.—*S. americanum*, Poir. in Lam. Encycl. Meth. vol. vii. p. 156. *Sicyos edulis*, Jacq. Pl. Carib. p. 32; Select. Stirp. Amer. p. 258, t. 163. *Chayota edulis*, Jacq. Select. Stirp. Amer. ed. pict. vol. ii. t. 245. *Cucumis acutangulus*, Descourt. Fl. Antill. vol. v. p. 94, tab. 328, excl. syn.; non Linn.—

O. Stapf.

The interesting Cucurbitaceous plant, *Sechium edule*, which forms the subject of our illustration, is known from Mexico southwards to Panama as the Chayote, a

name modified in the West Indies to Chocho. One of the cultivated plants of American origin unknown in a wild state, we owe the earliest European account of it to Hernandez, who in the sixteenth century found it used as a vegetable in Mexico. It is not mentioned by Sloane as a crop in Jamaica at the close of the seventeenth century. From P. Browne, however, we learn of its presence and of the use both of its fruits and its root in Jamaica by the middle of the eighteenth century, while according to Grisebach it had, by the middle of the nineteenth century, become naturalised there in thickets. Its cultivation has now extended to Louisiana, to some of the Atlantic and of the Pacific Islands, to Southern Europe and Northern Africa, to the East Indies and to Australia. In its new homes it is known, according to its source, now by its West Indian, now by the Mexican name. In suitable climates the Chayote is not difficult to grow. It is not fastidious as to soil, but requires shelter, as it is susceptible to injury from wind, and must be provided with support because, in the Tropics, it thrives poorly if left to trail on the ground. The perennial root, which resembles a Yam, enables it to be cultivated in regions liable to frosts, provided these are not so severe as to affect the soil. Where the ground is frozen in winter, however, it needs greenhouse conditions, and in this country is only to be met with in conservatories capable of supplying sufficient room for its development. Under such circumstances its vigorous growth and its ornamental leaves render it a striking object. For the material for our figure we are indebted to Mr. R. I. Lynch, by whom it has been supplied from a plant which flowered and fruited at the Cambridge Botanic Garden in 1916. Like many other economic species, the Chayote exhibits a considerable degree of variation in shape of leaf, length and density of raceme, indumentum and length of neck of ovary, as well as in form, colour and armature of fruit. It is not at present possible to estimate the significance or taxonomic value of this variability. The germination of the solitary seed presents some features of interest. At maturity the seed is enclosed in the fruit, but prior to germination it grows so that the tips of the cotyledons extend further

towards the base of the fruit while the hypocotyl emerges from the apex and emits several rootlets. As these rootlets find their way into the soil the stem arises from between the cotyledons; the enlargement of the root does not take place until the second year. In Mexico advantage is taken of this peculiarity, and the seed is allowed to germinate before the fruit is planted.

DESCRIPTION.—*Shrub*, monoecious, climbing extensively; stem over 4 in. thick; branches sulcate, smooth, glabrous. *Leaves* membranous, up to 10 in. across, rounded cordate, sinus sometimes broad, at others deep and narrow, margin angularly 3–5-lobed, the lobes entire or occasionally finely toothed, middle lobe acuminate, scabrid above, smooth except on the nerves and veins beneath; petiole smooth, glabrous, up to 6 in. long. *Tendrils* glabrous, 2–2½ in. long, simple below, then usually 3-fid. *Male flowers* racemose; peduncle up to 1 ft. long; racemes short and dense or broken up into irregularly disposed fascicles; pedicels very short, beset with short white hairs. *Receptacle* hemispherical, short, almost glabrous outside. *Sepals* linear-subulate or subulate, about $\frac{1}{8}$ in. long. *Corolla* nearly 5-partite; segments ovate, acute, $\frac{1}{5}$–$\frac{1}{4}$ in. long, pale-yellowish. *Staminal column* very short; anthers free, $\frac{1}{12}$–$\frac{1}{10}$ in. long, one 1-celled, the others 2-celled, the cells sigmoid. *Female flowers* solitary or in pairs, here and there in company with the male racemes, with calyx and corolla as in the males. *Ovary* inferior, obovoid, abruptly narrowed at the tip into a thin short neck, slightly 5-grooved, often hirtellous. *Style* $\frac{1}{12}$–$\frac{1}{8}$ in. long; stigma depressed-capitate. *Fruit* large, more or less pyriform, fleshy, deeply grooved, smooth or beset with soft spinules. *Seed* solitary, ovate, compressed; testa woody, smooth. *Embryo* with fleshy cotyledons, often germinating in the fruit.

TAB. 8738.—Fig. 1, male flower; 2, stamens; 3, female flower, sepals and petals removed; 4, ovary, in vertical section; 5, fruit, a portion removed to show seed germinating *in situ*; 6, embryo:—*all enlarged except* 5 *and* 6, *which are of natural size.*

M.S. del. J.N. Fitch lith.

Vincent Brooks, Day & Son Lt.d imp.

L. Reeve & Co. London.

Tab. 8739.

SYRINGA WILSONII.

Western China.

Oleaceae. Tribe Syringeae.

Syringa, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 675.

Syringa Wilsonii, *Schneider in Sargent, Pl. Wilson.* vol. i. p. 300 (1912), *et in Handb. Laubholzk.* vol. ii. p. 1064; species *S. tomentellae*, Bur. et Franch., arcte affinis sed foliis supra mox glabris subtus nisi secus nervos glabris apte distinguenda.

Frutex 2·5–6-metralis; ramuli juniores glabri, lenticellis pallidis sparse notati; gemmae terminales glabrescentes, ad 8 mm. longae. *Folia* decidua, elliptica vel ovata, acuminata, basi nunc late nunc anguste cuneata, 3·7–10 cm. longa, 2·5–5·5 cm. lata, primum ciliata, supra saturate viridia mox glaberrima, subtus pallidiora secus costam nervosque pubescentia; petiolus 6–12 mm. longus, pubescens. *Panicula* terminalis ad 20 cm. usque longa, 10–15 cm. lata, glabra vel parce pubescens foliis perpaucis basi ornata. *Flores* numerosissimi, odorati. *Calyx* cupularis, 1–5 mm. longus latusque, glaber, margine truncatus vel minutissime dentatus. *Corolla* pallide lilacina, 9 mm. longa, basi tubulosa; limbus 4-lobus, lobi ovati utrinque glabri. *Stamina* 2, parte superiore tubi corollae affixa; filamenta perbrevia; antherae oblongae, luteae. *Capsula* fusiformis, acuta, **1·5 cm. longa, lenticellata, glabra.—W. J. Bean.**

Syringa Wilsonii is undoubtedly a very close ally of *S. tomentella*, Bureau & Franchet, and it is difficult to point to any character of essential importance to distinguish them except the markedly pubescent character of the latter. Both leaf surfaces in *S. tomentella* are pubescent, the lower one almost velvety; the main and secondary axes of the panicle, as well as the pedicels and calyx, are also pubescent. We have not seen the fruit of *S. tomentella*, but that of *S. Wilsonii* at Kew is perfectly glabrous. Mr. E. H. Wilson discovered this lilac on the mountains near Tachien-lu in Western Szechuan, China, when collecting for Harvard University in 1908. *S. tomentella* was collected by Mr. A. E. Pratt in the same district about twenty years earlier and at about the same elevations, viz. 8,000–10,500 feet. The plant from which the material for our plate was gathered

was presented to Kew in 1910 by Professor Sargent. It has flowered for several years past, usually about the beginning of June. At that season it makes a charming picture, all the more so because it comes into bloom after the flowers of the race of common lilacs have faded. It likes a loamy moist soil, and may be propagated by cuttings or seeds.

DESCRIPTION.—*Shrub*, 8–20 ft. high; young branches glabrous, sprinkled thinly with pale lenticels; terminal buds glabrescent, ultimately $\frac{1}{3}$ in. long. *Leaves* deciduous, elliptic to ovate, acuminate, broadly to narrowly cuneate at the base, $1\frac{1}{2}$–4 in. long. 1–$2\frac{1}{4}$ in. wide, at first ciliate; dark green and soon quite glabrous above, pale beneath and pubescent on the midrib and lower veins; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. long, pubescent. *Panicles* terminal, up to 8 in. long and 4–6 in. wide, glabrous to sparsely pubescent, with a few leaves at the base. *Flowers* very numerous, scented like common lilac, but not so strongly. *Calyx* cup-shaped, $\frac{1}{16}$ in. long and wide, truncate or with a few small teeth, glabrous. *Corolla* pale lilac, $\frac{3}{8}$ in. long, the base tubular, dividing at the mouth into four ovate lobes, glabrous within and without. *Stamens* 2, affixed to the upper part of the corolla tube; filaments very short; anthers oblong, yellow. *Style* $\frac{1}{8}$–$\frac{1}{6}$ in. long. *Capsule* fusiform, acute, $\frac{2}{3}$ in. long, lenticellate, glabrous.

TAB. 8739.—Fig. 1, calyx and pistil; 2, section of calyx, showing ovary and style; 3, corolla laid open; 4 and 5, anthers; 6, fruit; 7, seed; 8, embryo:—*all enlarged except* 6, *which is of natural size.*

M.S. del. J.N. Fitch. lith.

Vincent Brooks. Day & Son Lith.

L. Reeve & Co. London.

Tab. 8740.

CRYPTOPHORANTHUS Dayanus.

Colombia.

Orchidaceae. Tribe Epidendreae.

Cryptophoranthus, *Rodr.; Gen. et Sp. Orch. Nov.* vol. ii. p. 79.

Cryptophoranthus Dayanus, *Rolfe in Gard. Chron.* 1887, vol. ii. pp. 692, 693, fig. 134, *et in Ill. Hort.* vol. xxxix. p. 21, t. 146; *Veitch, Man. Orch.* pars v. p. 9, cum icon.; species a caeteris hujus generis floribus maximis facile distinguenda.

Herba epiphytica, circiter 25 cm. alta. *Caules* aggregati, cylindracei, subgraciles, vaginis spathaceo-oblongis subimbricatis obtecti, monophylli. *Folia* subsessilia, late elliptica vel orbiculari-elliptica, subobtusa, coriacea, 6–9 cm. longa, 3·5–5·5 cm. lata. *Flores* axillares, solitarii vel pauci, magni, straminei, brunneo-maculati; bracteae ovatae, apiculatae, 4–5 mm. longae; pedicelli 1–1·5 cm. longi. *Sepala* elliptico-oblonga, apice et basi connata, lateraliter libera, utrinque fenestrata, tubum clausum 3·5–4 cm. longum apice recurvum et apiculatum formantia. *Petala* ovata, subobtusa, circiter 4 mm. longa. *Labellum* hastato-oblongum, obtusum, 5 mm. longum, apice denticulatum, basi tuberculo conico verruculoso instructum. *Ovarium* alatum, alis crispo-undulatis. *Columna* oblonga, angulata, 4 mm. longa. *Pollinia* 2, elliptico-ovoidea. — *Masdevallia Dayana,* Reichb. f. in Gard. Chron. 1880, vol. xiv. p. 295; id. 1884, vol. xxvi. p. 428, fig. 86.—R. A. Rolfe.

The remarkable Orchid here figured is believed to have first appeared in cultivation in the collection of Mr. Linden. At a sale of his plants an example was acquired by the late Mr. J. Day of Tottenham as an undescribed *Restrepia*, believed to be a native of New Granada. This plant flowered in Mr. Day's collection in July, 1875, and five years later it was described for the first time by Professor Reichenbach as *Masdevallia Dayana*. The generic position then assigned to our plant was in keeping with that accorded to a near ally from Jamaica originally described by Professor Lindley as *Specklinia atropurpurea*, but later redescribed by the same author as *Masdevallia fenestrata*, Lindl. This Jamaican species has been figured at t. 4164 of this work where Sir William Hooker, who termed it the "Windowed Masdevallia," has

given a full and clear account of the peculiar appearance which its flowers assume. The singular arrangement was again very carefully described and discussed by Mr. Darwin in 1862, though in this instance that author was under the necessity of concluding that "some new and curious contrivance has here to be made out," and the riddle as to how in this case insects perform the act of fertilisation still remains unsolved. The original belief that the species here described was a native of Colombia was in time confirmed by the receipt of examples sent from that country by Mr. G. Wallis to Messrs. James Veitch and Sons. The generic position which Reichenbach and Lindley had assigned to this plant and its Jamaican congener was felt to be very unsatisfactory, and in 1887 the "Window-bearing Orchids," of which there were at least eight, were made the subject of careful study by Mr. R. A. Rolfe, who then showed that both the Jamaican and Colombian species belong to the genus *Cryptophoranthus*, established by Mr. Barbosa-Rodriguez, now known to include fourteen described species, among which they stand as *Cryptophoranthus atropurpureus* and *C. Dayanus* respectively. The cultivation of *C. Dayanus* does not offer any especial difficulty; it thrives well in a tropical house under the conditions suitable for species of *Masdevallia*. The species is now not uncommon in collections; the plant here figured flowered in the Kew collection in October, 1916.

DESCRIPTION.—*Herb*, epiphytic, about 10 in. high; stems clustered, cylindric, rather slender, clothed with oblong somewhat imbricate spathaceous sheaths, 1-foliate. *Leaves* subsessile, wide-elliptic or orbicular-elliptic, rather obtuse, coriaceous, $2\frac{1}{4}$–$3\frac{1}{2}$ in. long, $1\frac{1}{2}$–$2\frac{1}{4}$ in. wide. *Flowers* axillary, solitary or few, large, straw-coloured with brown blotches; bracts ovate, apiculate, $\frac{1}{6}$–$\frac{1}{5}$ in. long; pedicels $\frac{1}{3}$–$\frac{2}{3}$ in. long. *Sepals* elliptic-oblong, free in the middle but connate at base and apex so as to form a tube, laterally fenestrate, recurved and apiculate at the tip. *Petals* ovate, somewhat obtuse, about $\frac{1}{6}$ in. long. *Lip* hastate-oblong, obtuse, $\frac{1}{5}$ in. long, denticulate at the tip and furnished at the base with a conical warted tubercle. *Ovary* winged, the wings crispately wavy. *Column* oblong, angled, $\frac{1}{6}$ in. long. *Pollinia* 2, elliptic-ovoid.

TAB. 8740.—Fig. 1, a flower with the sepals removed; 2, lip and column in their natural position; 3, lip; 4, column; 5, anther-cap: 6, pollinia;—*all enlarged.*

M.S. del. J.N. Fitch. lith.

Vincent Brooks, Day & Son Lt^d imp.

L. Reeve & C° London.

Tab. 8741.

GREVILLEA oleoides.

New South Wales.

Proteaceae. Tribe Grevilleeae.

Grevillea, *R. Br.*; *Benth. et Hook. f. Gen. Plant.* vol. iii. p. 180.

Grevillea oleoides, *Sieb. in Roem. et Schult. Syst.* vol. iii. *Mant.* p. 277; *R. Br. Prot. Nov.* p. 17; *Meisn. in DC. Prodr.* vol. xiv. p. 353; *Reichb. Icon. Exot.* t. 104; *Benth. Fl. Austral.* vol. v. p. 468; affinis *G. puniceae*, R. Br., sed foliis longioribus et plerumque angustioribus, inflorescentiis subsessilibus differt.

Frutex erectus; ramuli adpresse sericeo-tomentosi, apicem versus foliati. *Folia* inferiora 3-nata, intermedia geminata, superiora solitaria, linearia, basin versus sensim attenuata, apice acute apiculata, 6–9 cm. longa, 0·3–0·7 cm. lata, supra viridia, minute punctata, infra sericeo-velutina, argentea. *Racemi* capituliformes, ramulos laterales breves terminantes, fere sessiles, circiter 12-flori; pedicelli 0·5 cm. longi, sericeo-pubescentes. *Perianthium* kermesinum, extra tenuiter sericeum, intus superne dense barbatum, tubo 1·2 cm. longo infra limbum obliquum revoluto. *Antherae* 1 mm. longae, subsessiles. *Glandula* semiannularis, crassa, carnosa. *Ovarium* stipitatum, glabrum; stylus longe exsertus, 3 cm. longus, apicem versus sensim latior, stigmate oblique orbiculari plano coronatus.—*Grevillea Seymouriae*, Sweet ex Meisn. l.c. 354.—J. Hutchinson.

The *Grevillea* here described, *G. oleoides*, is a native of New South Wales, where it is a common shrub in sandy places in the bush. The plant from which material for our figure was obtained was raised at Kew from seeds purchased in 1910 from Messrs. J. Staer and Company, Wahroonga, New South Wales. It grows well and flowers readily in an ordinary greenhouse under the treatment suitable for the nearly allied *G. punicea*, R. Br., figured at t. 6698 of this work, and like that species is a desirable decorative conservatory plant. The characteristic arrangement of the leaves, in groups of three near the bases of the leafy stems, higher up in pairs, near the apex solitary, is due to the production of abbreviated axillary lateral shoots. In wild specimens the leaves of *G. oleoides* exhibit considerable variation in size, from long and rigidly linear with strongly revolute margins to

broadly linear or oblanceolate. The forms with broad leaves approach very closely indeed to *G. punicea*, and when the plant is not in flower the only obvious difference lies in the greater length of the leaves in *G. oleoides*. In flower the two species are more readily separated, the inflorescence of *G. oleoides* being nearly sessile.

DESCRIPTION.—*Shrub*, erect; twigs clothed with appressed silky hairs, leafy towards the top. *Leaves* linear, gradually narrowed to the base, apex sharply apiculate, 2½–3½ in. long, ⅛–⅓ in. wide, green above, finely punctate, silvery silky-tomentose beneath; uppermost leaves solitary, those lower down the twig in groups of 2–3. *Racemes* congested at the tips of short lateral twigs, almost sessile, about 12-flowered; pedicels ⅕ in. long, silky-pubescent. *Perianth* bright carmine, thinly silky outside, densely bearded towards the top within, tube ½ in. long, revolute below the oblique limb. *Anthers* short, subsessile. *Gland* semi-annular, thick, fleshy. *Ovary* stipitate, glabrous; style far exserted, 1¼ in. long, gradually thickened towards the apex, crowned by the oblique flat orbicular stigma.

TAB. 8741.—Fig. 1, flower; 2, branched hair; 3, section of lower portion of the perianth, showing ovary and gland; 4, limb of perianth and anther; 5, anther seen from behind:—*all enlarged*.